MAGNI

SDM-560/SDM-560M Serial Digital/ Composite Video Signal Monitor

Operator's Manual

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1. About This Manual

Introduction

This manual describes how to install, configure, and operate the SDM-560/560M Serial Digital/Composite Video Signal Monitor (SDM-560/560M). The information presented will help to familiarize you with all aspects of the SDM-560/560M and provide a reference tool for questions you might have in the future.

Audience

This guide is written specifically for anyone responsible for installing, configuring, and operating the SDM-560/560M.

Organization

This manual contains the following:

- Chapter 1: *About This Manual*— Describes the organization of this manual. Conventions, special notices, and safety precautions used throughout the manual are also included.
- Chapter 2: *Product Overview*— Describes the features and capabilities of the SDM-560/560M.
- Chapter 3: *Installation*— Describes how to connect and configure the SDM-560M.
- Chapter 4: *Front Panel Operation*— Explains how to use the SDM-560M front panel menu buttons.
- Chapter 5: *Operating the SDM-560M* — Explains how to operate the SDM-560M using the *Config* and *Msmt* menu options.
- Chapter 6: *Viewing Waveforms, Vectors, and Pictures* — Explains how to view waveforms, vectors, and pictures using the SDM-560M.
- Chapter 7: *Audio*— Explains how to add audio measurement to a display.
- Chapter 8: *Automatic Measurement*— Explains how to take specific kinds of measurements on the most common types of test signals (SDM-560M only).
- Chapter 9: *Measurement Screens (Parameters and Limits)*— Lists details about the SDM-560M automeasurement screens.
- Appendix A: *Specifications*— Lists the SDM-560/560M electrical and mechanical specifications.

- Appendix B: *Connector Pinouts*— Identifies and describes the pinouts of each connector on the SDM-560M.
- Appendix C: *SDM-560M Memory Locations* — Lists the recommended memory locations for the SDM-560M.
- Appendix D: *Calibration*— Explains how to access the *Calibration* menu options for the SDM-560M.
- Appendix E: *SDM-560M Applications*— Describes some of the applications that are available for the SDM-560M.
- Appendix F: *Command Codes*— Describes the RS-232 protocol between the SDM-560M and a PC.
- Appendix G: *Glossary of Terms*— Lists commonly used video and graphics terminology.

Conventions

Convention Example	Description
Refer to	Italics are typically used for titles, menus, and references to other sections of this manual or other manuals.
`A:\setup`	Monospaced text indicates a command that you need to enter to run an application or utility.
Enter	Bold faced text indicates a key that must be pressed on a PC keyboard to complete an action.
INPUT	Upper case text indicates an option from the *Configure* or *Measurement* menu that has sub-menu options under it when selected.

Special Notices

Two kinds of special notices are used in this Operator's manual to emphasize specific information.

WARNING: indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.

CAUTION: indicates the presence of a hazard that might cause damage to hardware or that might corrupt software.

Safety Precautions

Adhere to the following safety precautions to ensure proper use of the SDM-560M.

WARNING: FOR PLUGGABLE EQUIPMENT, THE SOCKET OUTLET SHALL BE INSTALLED NEAR THE EQUIPMENT AND SHALL BE EASILY ACCESSIBLE.

CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

Notes

2. Product Overview

SDM-560M Serial Digital/Composite Video Signal Monitor (SDM-560M)

The SDM-560M is a system that can monitor both SD601 (525/625) and composite (NTSC/PAL) with output to Serial Data Interface (SDI) and composite picture monitors for display.

The SDM-560M provides an equipment solution for facilities undergoing the transition from analog to digital. It also provides an ideal monitoring solution for video production and broadcast facilities, environments deploying video graphic workstations, and professional video and television equipment manufacturing facilities.

The SDM-560M's display technology provides picture, waveform, vector, audio, and basic digital signal status for serial digital 601 and composite analog signals on a single screen. It also provides on-screen readings for digital strength, jitter, and EDH errors.

The SDM-560M also provides three choices for audio monitoring: SDI embedded audio, two AES-3, or four channels of analog audio input. Note that all four audio channels are displayed on the screen for any one type of audio monitoring. Two phase monitoring displays are available in split screen mode; one each for the two left and right pairs.

In addition, The SDM-560M provides automatic level monitoring in digital, analog component or composite formats for the digital or analog composite inputs. This monitoring can be displayed as bars, with red indicating out of limit parameters, Picture Guard icons on the picture for out of limit parameters, or reported through RS-232, modem, or ground closure.

Features

- Provides two switchable loop-through inputs for serial digital (601), one loop-through input for composite, and one loop-through input for S-video.
- Provides a loop-through composite reference input for synchronizing purposes.
- Monitors key parameters of a serial digital signal including input signal strength, gamut errors, EDH errors, signal jitter, and audio presence.
- Parameter error status is indicated by LEDs on the front panel, and where applicable, their numerical values on a video monitor display.
- Decodes serial 601 to Y, B-Y, PR-Y analog component outputs.
- Provides composite, S-video, and serial digital outputs for monitor display. The monitor output displays the audio signal strength and readouts. The monitor output can also be selected to display waveform, vector, and measurement screen information.

- Decodes the embedded serial audio signal into two AES digital outputs and four analog audio channel outputs (for monitoring purposes only).
- Audio monitoring and output switchable to one of three audio inputs: Analog Audio In, AES In, or Embedded.
- Provides an automated measurement feature that includes numeric readouts of key signal parameters, generate on-screen alarms, ground closure, and ASCII text reports.
- Provides an effective solution for remote monitoring of serial/digital/composite signals and automated quality control of local signals.

Typical SDM-560M Applications

- Provides television facilities using mixed analog/digital equipment or all digital formats with monitoring capabilities.
- Monitors analog/serial digital test signals (including live video) and displays the results on a picture monitor.
- Ensures the integrity of serial digital signals.
- Provides readout of key measurement parameters of a serial digital signal including: jitter, EDH error, and signal strength.
- Detects the gamut error of a color signal where an operator sets programmable limits.
- Decodes and converts the serial digital signal into analog component.
- Encodes the serial digital input signals into composite formats (for waveform display).
- Decodes the embedded audio in the serial digital bit stream into AES digital and analog audio forms for processing, listening, or monitoring.
- Monitors the picture content and gamut of the serial digital signal using a picture monitor (composite, S-video, and SDI outputs).

SDM-560M Display Methods

Monitored Parameter	LED	Picture Monitor Display
Signal Strength notifies you if the incoming SDM signal falls below a user-defined threshold.	**Yes**	**Horizontal bar graph (SSI)**
Gamut error decodes the incoming SDM signal and notifies you if a gamut error occurs.	**Yes**	**Brightup on error**
Gamut Brightup brightens the error pixels on the monitor screen.	**Yes**	**Brightup**
Error Rate monitoring notifies you if the EDH and/or TRS error rate exceeds a user-defined threshold.	**Yes**	**Number**
Jitter (PLL) notifies you if the SDM input signal has depleted the user-defined reserve range. The PLL preserve range represents the margin remaining in alignment jitter and indicates the receiver's ability to recover the digital data.	**Yes**	**Horizontal bar graph and numbers**
Audio notifies you that one or more channels of audio is present in the SDM signal. Audio levels can be displayed on a picture monitor.	**Yes**	**Vertical bar graph and phase display**
Embedded Audio indicates the audio amplitudes for each AES channel (AES1 and AES2).	**Yes**	**Vertical bar graph and phase display**
External Analog I/O and AES I/O indicates the audio amplitudes for each external analog or AES channel (AES1 and AES2).	**Yes**	**Vertical bar graph and phase display**
Ancillary data present notifies you that ancillary data, excluding the audio and EDH, is present in the SDM signal.	**Yes**	
Picture Guard lets you watch live video and assures you that the signal complies with certain standards.	**No**	**Small out of tolerance box**

SDM-560M Functional Block Diagram

Figure 2-1 shows a functional block diagram of the available inputs and outputs for the SDM-560M.

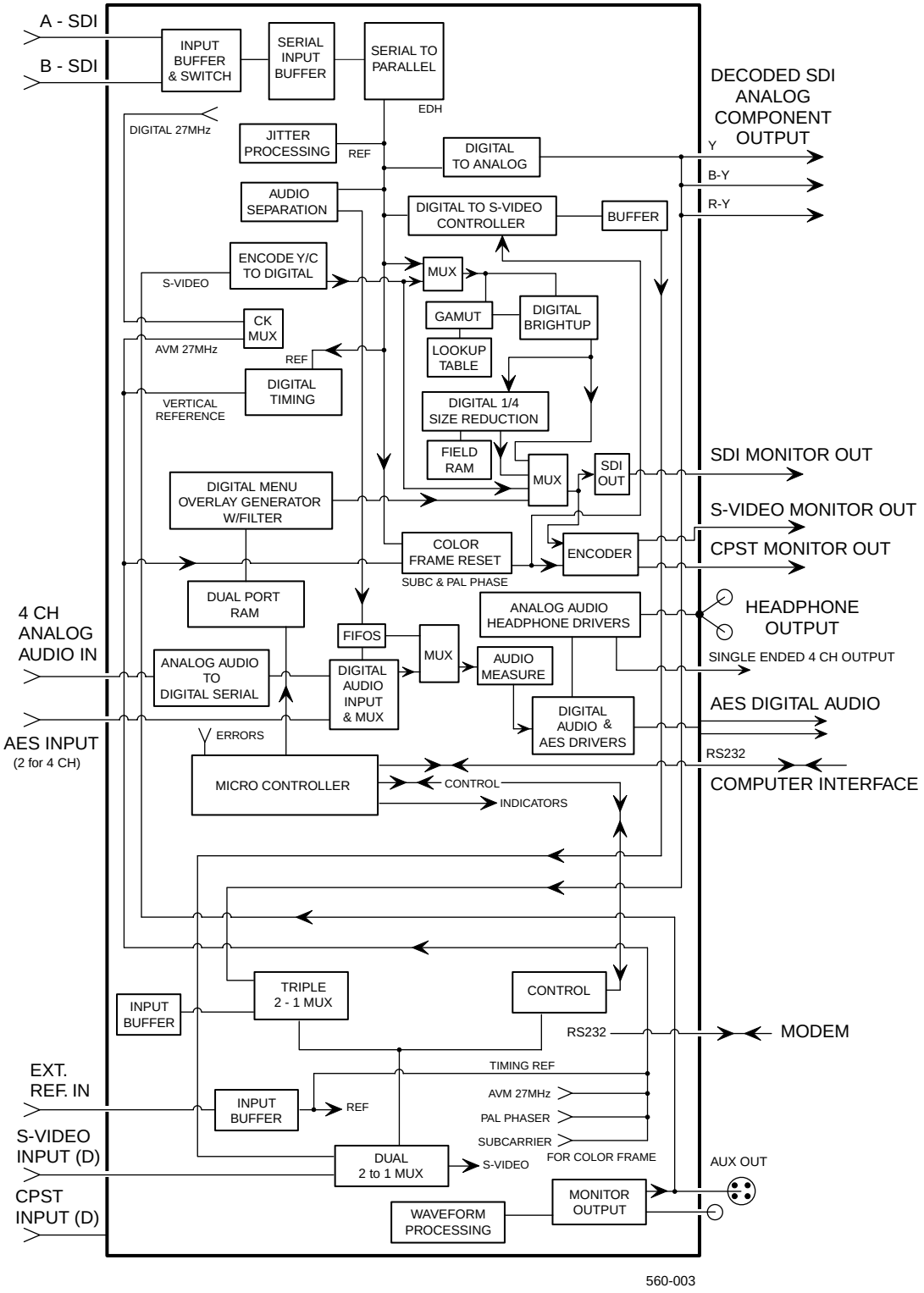
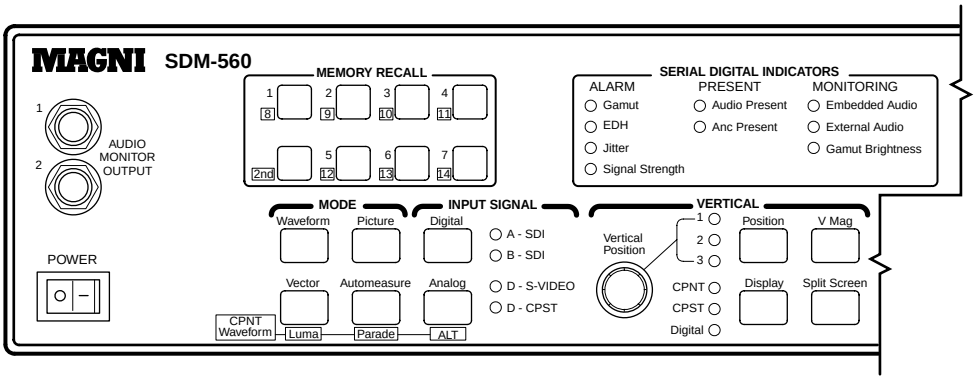


Figure 2-1. SDM-560M Functional Block Diagram

SDM-560M Front View

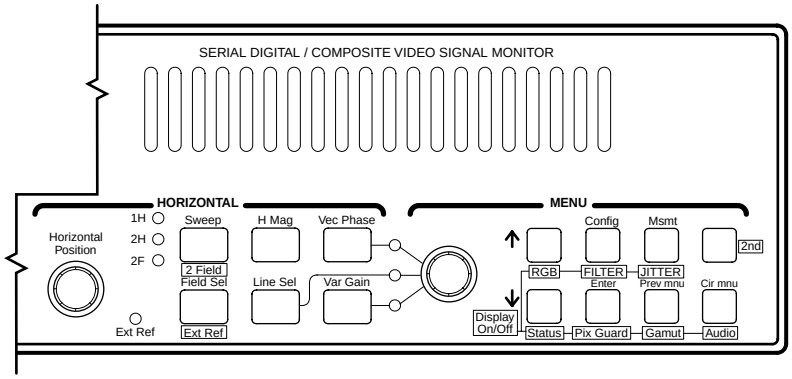
The following LEDs, indicators, buttons, switches (knobs) can be viewed from the front of the SDM-560M (see Figure 2-2).

NOTE: Some buttons on the front panel have two functions when used in conjunction with the **Blue** (2nd) button.



560M-004

Figure 2-2. SDM-560M Front View (1 of 2)



560-005

Figure 2-2. SDM-560M Front View (2 of 2)

Audio Monitor Output Jacks

Standard headphone jacks are used for monitoring audio outputs. Headphone volume is controlled through the *AUDIO* menu options.

Power Switch

Powers the SDM-560M on and off.

Memory Recall Buttons

The **Memory Recall** buttons and the **Blue** button are used to select one of the 14 pre-configured SDM-560M waveform, vector, or picture settings.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the Memory Recall buttons.

Mode Buttons

The **Mode** buttons and the **Blue** button determine what the monitor displays: Waveform, Vector, Picture, or Automeasure.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the Mode buttons.

Digital/Analog Input Signal Buttons

These buttons let you choose one of four signal inputs (A-SDI, B-SDI, D-S-Video, or D-CPST). The two buttons switch between the selected analog and digital signals. Pressing either button, when in the selected mode, toggles between the two analog or digital inputs.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the Input Signal buttons.

Input Signal LEDs

Four input signal selections with LEDs are available: two for the serial data, one for S-video, and one for composite. The four inputs are designated as A-SDI, B-SDI, D-S-video, and D-CPST.

NOTE: Only one signal input is available at any one time as indicated by the corresponding green LED.

Serial Digital Indicators

The Alarm and Present indicators are linked to the monitor function in the measurement menu. As a result, they are always active and cannot be disabled. These indicators refer to the selected or last selected serial digital input signal. The Monitoring indicators can be turned on or off depending on their application.

Alarm LEDs

- The yellow Gamut LED indicates a gamut error occurred in the SDI signal. The error can be in RGB, component, and composite formats decoded from the SDI. Gamut errors occur when a succession of a selected number of pixels violates any preset gamut limit (Gamut Filter Select – programmable from 1 to 15 pixels).

  Refer to Chapter 5, "Operating the SDM-560M," for additional information.

- The yellow EDH LED indicates that EDH is not present or there is an EDH error.
- The yellow Jitter (PLL) LED warns you that the jitter in the SDI signal has depleted the set PLL reserve range. The PLL reserve range is a representation of alignment jitter and directly affects the SDI receiver's ability to properly recover the digital data.

- The yellow Signal Strength LED lights during one of the following conditions:
  - The signal strength of the incoming SDI signal falls below the set threshold level for the system to ensure proper recovery of the digital data.
  - Loss of the SDI incoming signal.

Present LEDs

- The green Audio Present LED indicates the presence of embedded audio in the SDI signal (one or more channels).
- The green Ancillary (Anc) Present LED indicates the presence of ancillary data, excluding the audio data and EDH, which is indicated by the Audio Present LED and EDH LED.

Monitoring LEDs

Each time the SDM-560M input is selected for either an A-SDI or B-SDI input, these green LEDs indicate additional features for the Picture Monitor Display (PMD) and can be turned on or off by an operator depending on their application. The three LEDs are:

- Embedded Audio — Four vertical bars, two on each side of the picture display, representing AES1 and AES2, indicating the audio amplitudes for each channel.
- External Analog I/O/AES I/O Audio — Four vertical bars, two on each side of the picture display, representing external analog I/O or AES I/O, indicating fixed audio amplitudes for each channel.
- Gamut Brightup — This LED lights when the gamut error-brightening feature is on. While on, it brightens the error pixels on the monitor screen.

Vertical Position Knob, LEDs, and Buttons

The vertical section of the front panel includes Vertical Magnification (**V Mag**), Display (**Display**), Split Screen (**Split Screen**), and vertical positioning options.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the vertical section of the front panel.

Horizontal Position Knob, LEDs, and Buttons

The horizontal section of the front panel includes Line Select (**Line Sel**) and Field Select (**Field Sel**), Sweep Speed (**Sweep**) and Horizontal Magnification (**H Mag**), Vector Phase (**Vec Phase**), and horizontal positioning options.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the horizontal section of the front panel.

Rotary Switch (Knob)

The right knob is used to adjust the Vector Phase, Line Select, and Variable Gain functions of the SDM-560M. It can also be used to select and adjust items in the menu options.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the knob.

Menu Buttons

These buttons let you configure the SDM-560M to fit your specific needs.

Refer to Chapter 4, "Front Panel Operation," for more information about the functions of the Menu buttons.

SDM-560M Rear View

The following cable connectors can be viewed from the rear of the SDM-560M (see Figure 2-3).

Legend	Connector	Function
❶	RS-232 computer interface	A bi-directional communication interface that lets you control the SDM-560M by way of ASCII control codes.
❷	Serial digital input	Two switchable high impedance loop-through inputs (A-SDI and B-SDI).
❸	Decoded SDI outputs	The decoded Y, R-Y, B-Y outputs follow the Digital Input Signal Selection (A-SDI or B-SDI) as indicated by the front panel LED.
❹	Picture monitor outputs	These outputs (composite, SDI, and s-video) are available for a picture monitor display of a picture, waveforms, or signal status.
❺	Audio input/outputs	AES3 I/O – Used for a direct connection to stereo audio I/O through a 9-pin D-sub connector. Analog In – Provides a fixed amplitude input through a 9-pin D-sub connector. Analog Out – Provides a fixed amplitude output through a 9-pin D-sub connector.
❻	Power	Line voltage power connector (ac input).
❼	RS-232 modem interface	A bi-directional communication interface to modem that lets you control the SDM-560M over a standard telephone line.
❽	DC control/ alarm	DC Control – Lets you select any of the first four memories by grounding (earthing) pins 1 through 4. Alarm – When enabled, after an alarm delay, this open collector output (pin 5) goes to ground (earth) indicating an out-of-tolerance condition. *Refer to Chapter 3, "Installation," for additional information on this connector.*
❾	Auxillary (AUX) out	An auxillary S-video or composite monitor output signal for displaying waveforms.

continued

Legend	Connector	Function
❿	External reference input	A composite analog external reference signal representing studio reference timing.
⓫	D-S-video input	One switchable loop-through S-video input. Can only be selected using the *Input* menu options.
⓬	D-CPST input	One switchable loop-through composite input. Can only be selected using the *Input* menu options.

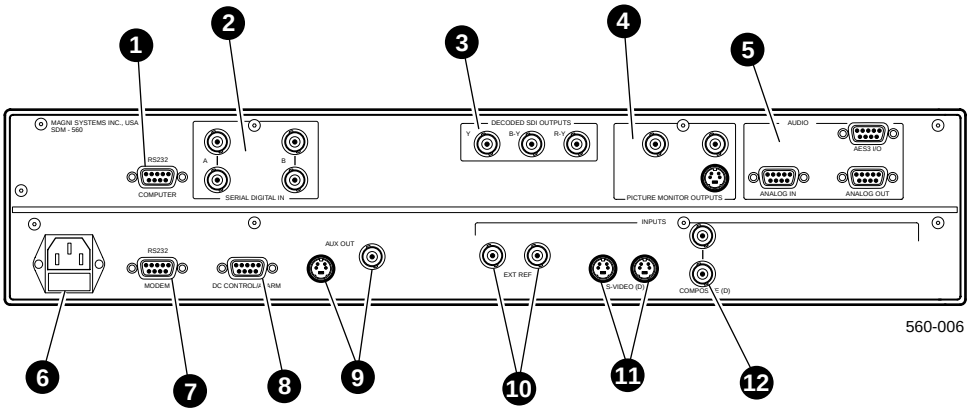


Figure 2-3. SDM-560M Rear View

SDM-560 Serial Digital/Composite Video Signal Monitor (SDM-560)

Like the SDM-560M, the SDM-560 is also a system that can monitor both SD601 (525/625) and composite (NTSC/PAL) with output to Serial Data Interface (SDI) and composite picture monitors for display.

The SDM-560 provides most of the features and capabilities of the SDM-560M with the following exceptions. The SDM-560 does not support:

- Video or audio automeasurement
- Picture Guard
- Reports
- Alarm (❽, Figure 2-3)
- Freeze alarm
- Audio phase meter
- Digital position of the **Display** button
- Memories 1, 2, and 5 do not include any of the functionality listed above

The SDM-560 also provides a limited amount of measurement functionality as shown in Figure 2-4.

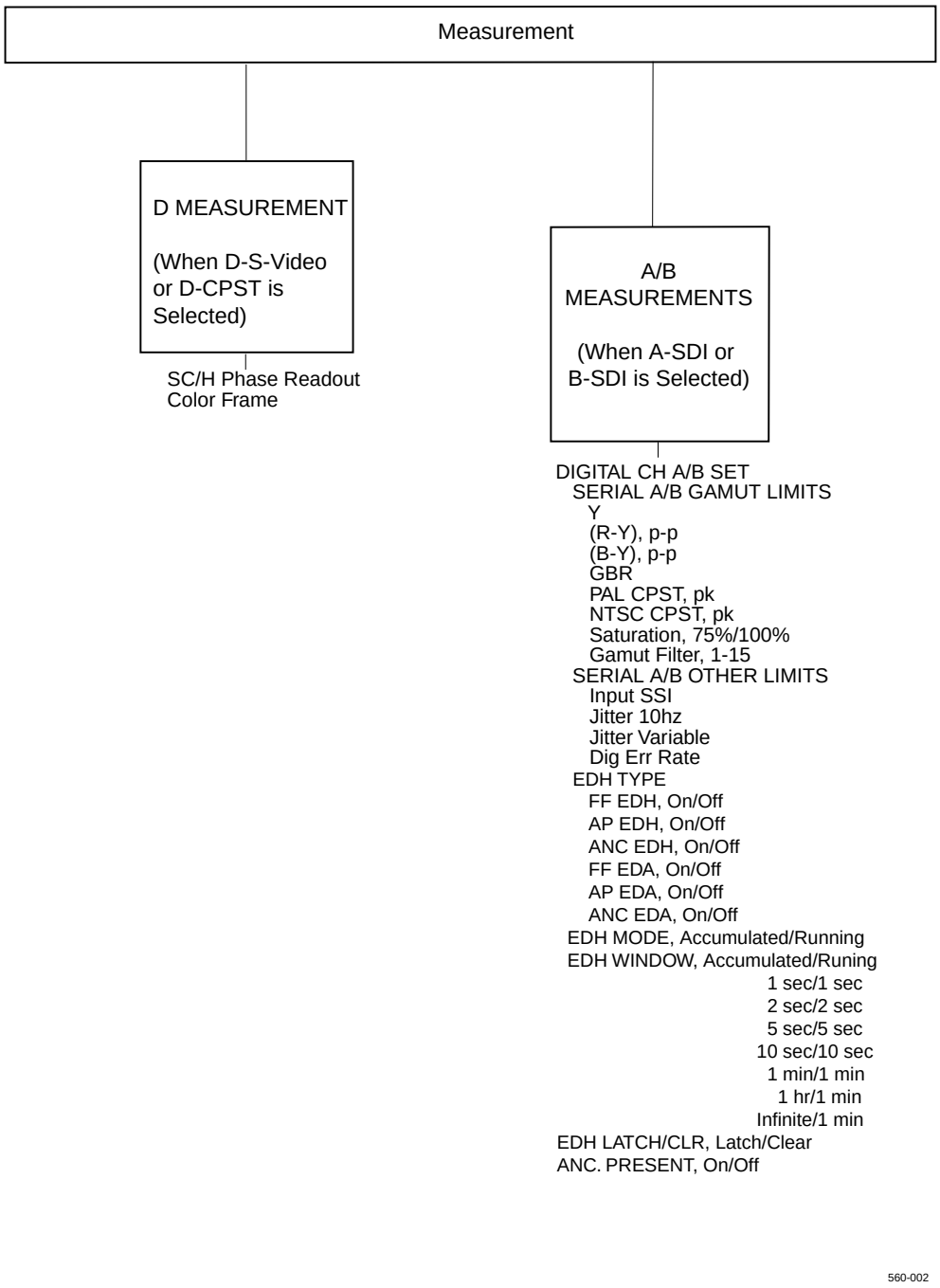


Figure 2-4. SDM-560 Msmt Menu Options

Notes

3. Installation

Introduction

This chapter describes how to install the SDM-560M Serial Digital/Composite Video Signal Monitor (SDM-560M) into a rack, how to connect cables to it, and how to configure it for your specific needs.

Installing the SDM-560M into a Rack

The SDM-560M mounts into any industry-standard rack. To install the SDM-560M:

1. Install the rack ears onto the SDM-560M.
2. Insert the SDM-560M into the rack and then secure it using the supplied screws.
3. Connect the supplied power cord to an ac power source and to the back of the SDM-560M.

CAUTION: The SDM-560M produces very little heat and does not need a lot of air space. However, installing it in between two devices that produce a high amount of heat might cause overheating.

For optimal performance, keep the top cover air flow unrestricted.

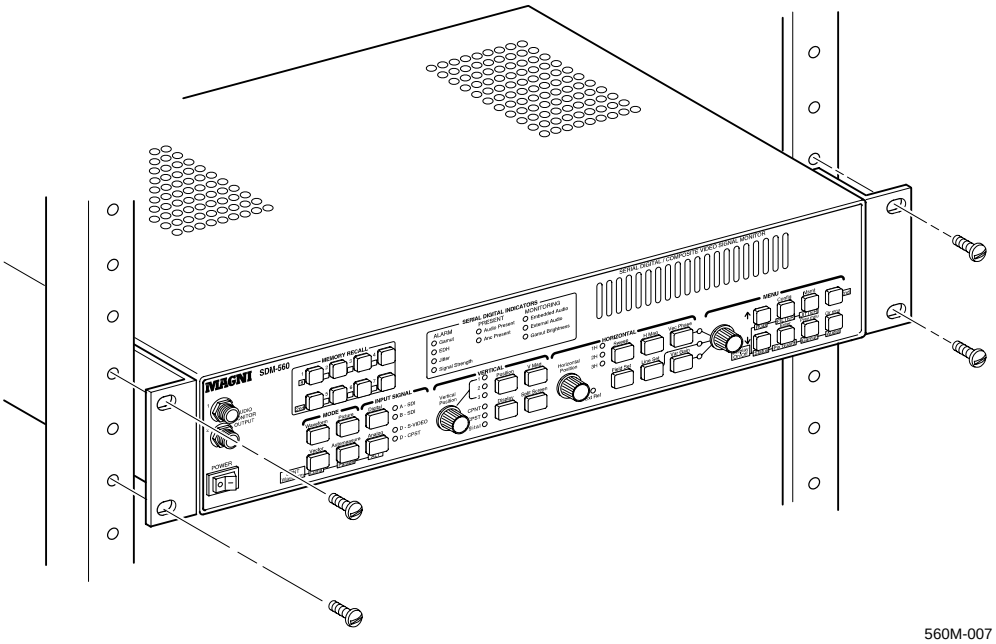


Figure 3-1. SDM-560M Rack Installation

Connecting the Signal Input Lines

Refer to chapter 2, "Product Overview," for detailed descriptions and the locations of the SDM-560M rear panel signal input connectors.

Configuring the Inputs

As you become familiar with the SDM-560M you will learn how flexible it is. The SDM-560M lets you select a variety of settings to fit your specific needs. However, an important thing to remember is the format of the five signal inputs: A-SDI (Serial Digital Interface), B-SDI, D-S-video, D-CPST (Composite), and an external reference (see Figure 3-2). All inputs automatically switch between 525/60 and 625/50 formats.

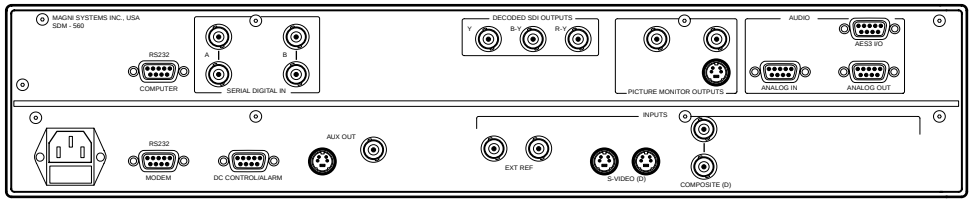
- A-SDI and B-SDI are two switchable high-impedance loop-through serial digital (601) inputs.
- D-S-video is a switchable loop-through input.
- D-CPST is a switchable loop-through composite 525/625 input.
- The external reference is a switchable loop-through composite 525/625 studio reference timing input (optional).

NOTE: Only one of the four signal inputs (A-SDI, B-SDI, D-S-video, or D-CPST) can be selected at any one time.

Also, any signal that ends at the loop-through input must be terminated at the other connector using a 75Ω terminator.

You can select one of the four signal inputs using the **Digital** or **Analog** buttons on the front panel. The **Digital** button lets you toggle between the A-SDI and B-SDI signal inputs. The **Analog** button lets you toggle between the D-S-video or D- CPST signal inputs.

Refer to Chapter 4, "Front Panel Operation," for more information about configuring the SDM-560M using the front panel buttons.



560-008

Figure 3-2. SDM-560M Rear View

To configure the SDM-560M for either a D-S-video or D-CPST signal input:

1. Press the **Config** button to access the *Configure* menu.
2. Using the arrow buttons, select *INPUT* and then press the **Enter** button.
3. Using the arrow buttons, select input D.

4. Using the **Enter** button or the knob, select CPST or S-video.
5. Press the **Clr Mnu** button to exit the menus.

   NOTE: The SDM-560M always powers up to the settings that were saved when it was last powered down. If you want to save the settings you just selected into one of the available memory locations, perform the procedures in "Saving Settings."

Saving Settings

To recall any stored memory at any time, press one of the Memory Recall buttons (for memories 1 through 7) or the **Blue** (2nd) button and then one of the Memory Recall buttons (for memories 8 through 14).

After you configure the SDM-560M, you need to save it in memory. The following procedure explains how to store an SDM-560M configuration in a memory location selectable via the front panel Memory Recall buttons (see Figure 2-2).

NOTE: You can also recall the first four memories through the ground closures of the DC control connector (see Figure 3-2).

When a configuration is saved in memory, all SDM-560M functions are stored in that memory. This includes items that are not displayed. For example, a waveform and measurement setup when a picture is displayed. For best results, recall a memory, make a modification, and then store the new settings in another memory location.

1. Configure the SDM-560M for a desired mode. This can normally be done by recalling a mode from another memory location.
2. Select the desired signal input by pressing the **Digital** or **Analog** button or through the *Config* menu options.
3. Using the Vertical and Horizontal Position knobs, center the display.
4. Press the **Config** button to access the *Configure* menu.
5. Using the arrow buttons, select *MEMORIES* and then press the **Enter** button.
6. Using the arrow buttons, select *Store Memory*.
7. Using the knob, select the desired memory number (1 through 14).
8. Press the **Down** arrow button to select *Store* and then press the **Enter** button.
9. Press the **Clr Mnu** button to exit.
10. If you intend to view signals of several different formats, save them in other available memories using steps 1 through 8.

    NOTE: Settings for other formats or standards are also stored. For example, (1) the +V on/off setting for PAL even when memory is stored for NTSC and (2) limit settings for both standards are stored.

    NOTE: You can set **ALL** memories back to their factory configuration by selecting *Default Memories* and then by pressing the **Enter** button twice.

Connecting the Monitor Outputs

Three SDM-560M picture monitor outputs are available (see Figure 3-2):

- SDI picture monitor
- S-video picture monitor
- CPST (composite) picture monitor

These video signal outputs can be looped to several monitors in different locations, fed through routing switchers, recorded, projected, or converted to other formats. You can do most anything with the output of the SDM-560M that you can do with any composite video picture. However, the last device at the end of the output loop must be terminated using a 75 Ω terminator. Note that before using the SDM-560M, it must first be connected to a monitor.

Refer to chapter 2, "Product Overview," for detailed descriptions and the locations of the SDM-560M rear panel output connectors.

Connecting Auxiliaries

The SDM-560M has the following auxiliary connections:

- Decoded SDI Analog Component Outputs (Y, B-Y, R-Y)
- AUX (auxiliary) Out (S-video or composite)
- Audio
  - AES3 I/O
  - Analog In
  - Analog Out
- Audio Monitor Output
- RS-232 Computer
- RS-232 Modem
- DC Control/Alarm

Refer to chapter 2, "Product Overview," for the locations of the SDM-560M auxiliary connectors.

Decoded SDI Analog Component Outputs (Y, B-Y, R-Y)

These outputs are from the digital input for a digital picture or other processing functions. Note that this output continues to appear even if the monitor displays a D input signal (D-S-video or D-CPST). The second line at the top-left of the monitor display then indicates the selected digital signal input that will be output to these connectors.

AUX Out

These outputs (S-video or composite) can be used when an application requires both a monitor for displaying waveforms and/or vectors and a monitor for displaying a digital picture at the same time.

AES3 I/O (Input/Output)

This connector provides two inputs (selectable via the *Config* menu) for single-ended 75Ω AES digital audio. The two AES balanced outputs are from the selected input.

Refer to Appendix B, "Connector Pinouts," for AES3 I/O pinout descriptions and locations.

Audio Monitor Output (Front Panel)

This is used for a direct connection to a set of headphones to monitor audio outputs.

Analog In

Provides fixed amplitude inputs for 4 balanced analog inputs (8 wire) through a 9-pin D-sub connector.

Analog Out

Provides an output of 4 single-ended audio signals from selected inputs through a 9-pin D-sub connector.

RS-232 Computer

This is used for a direct connection to a computer. The computer can be running Logbook Software or communication software to control the SDM-560M from a remote location.

RS-232 Modem

This is used for a direct connection to a modem or printer. When connected to a modem, the SDM-560M can be controlled over telephone lines using a computer running Logbook Software. When connected to a printer, waveforms and vectors can be printed to paper.

DC Control/Alarm

This 9-pin connector lets you select any of the first four front panel memories by grounding (earthing) any one of the four pins (DC control). An indication of the selection of one of the first three memories is given by the grounding of three other pins (refer to the following table).

Pin 5 (alarm output) is dedicated to an alarm. Each time a screen shows an out-of-tolorance condition, this pin goes to ground (earth) if *Alarm* is enabled and after a delay set in *Alarm Delay*.

Pin	Description
1	Recall memory 1
2	Recall memory 2
3	Recall memory 3
4	Recall memory 4
5	Alarm out
6	Memory 1 out
7	Memory 2 out
8	Memory 3 out
9	Ground (earth)

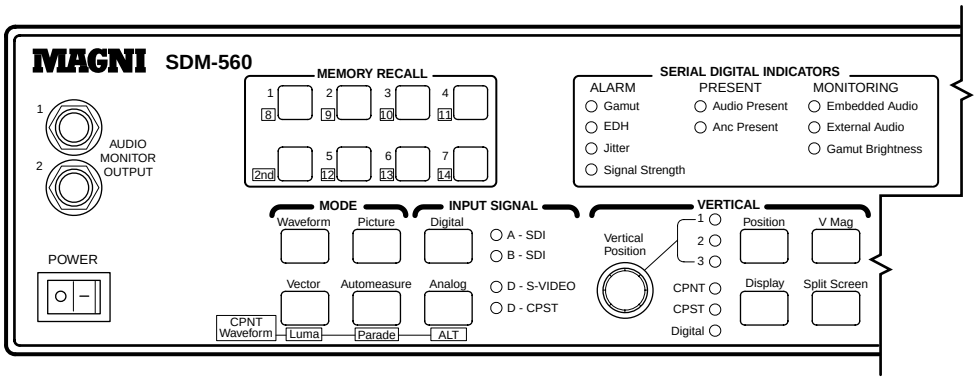
4. Front Panel Operation

Introduction

This chapter explains how to operate the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M) by using its front panel buttons and rotary switches (knobs). The SDM-560M front panel is made up of six main sections (see Figure 4-1):

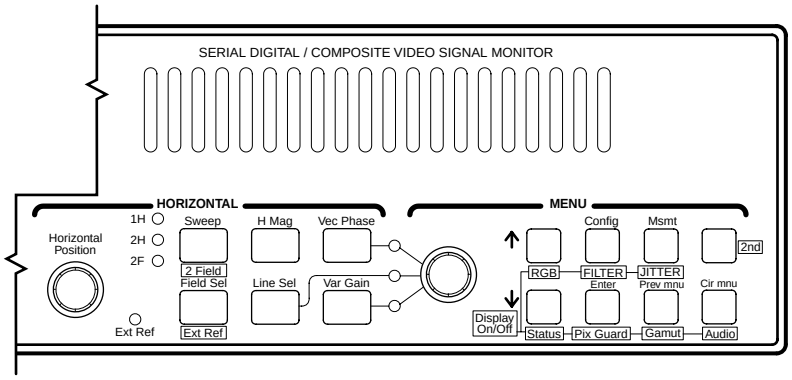
- Memory Recall
- Mode
- Input Signal
- Vertical
- Horizontal
- Menu

The remainder of this chapter describes the operational characteristics of each one. Also included is a monitor display explanation and sections on the *Config* (Configure) and *Msmt* (Measurement) Menu structures along with some basic rules for their many uses.



560M-004

Figure 4-1. SDM-560M Front View (1 of 2)



560-005

Figure 4-1. SDM-560M Front View (2 of 2)

Monitor Display Explanation

Figure 4-2 shows what you can see on a monitor display as you operate the SDM-560M using the front panel buttons and knobs. The table that follows explains each of the display areas.

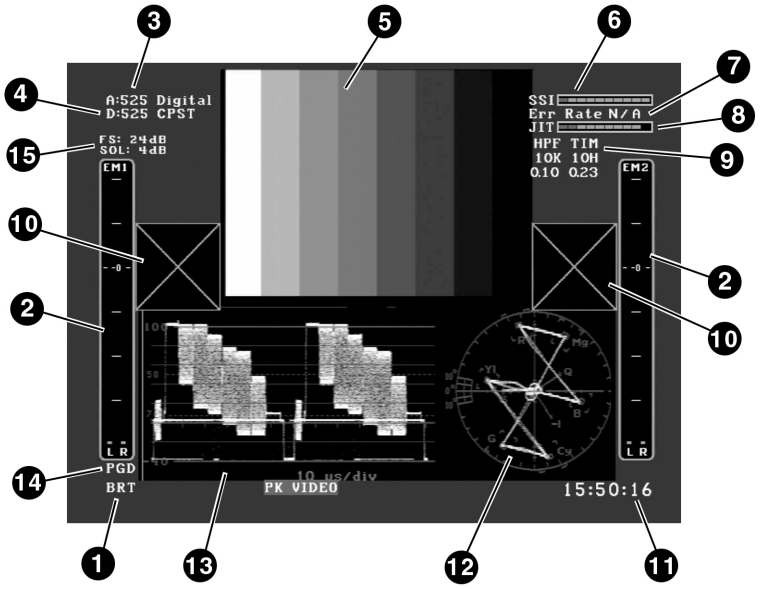


Figure 4-2. Monitor Display Explanation

Figure Legend	Description
❶	Gamut Brightup – If BRT is displayed, then gamut brightup is enabled.
❷	Audio Meters – Embedded, AES, or Analog audio metering.
❸	Indicates the selected and displayed input signal A, B, or D, the displayed signal system 525 (NTSC) or 625 (PAL), and the displayed signal format DIGITAL for the A or B input or S-video or CPST (selectable) for the D input.
❹	Indicates the same information as ❸ for the non-displayed input signal.
❺	Picture – Picture display.
❻	SSI: – Digital input signal strength at 300 m equivalent cable length.
❼	Err – Digital input error rate.
❽	JIT: – Jitter of digital input signal (red at 0.8 unit interval jitter as measured from the selected Chroma filter).
❾	Timing Jitter Number – Filtered to 10 Hz, showing jitter down to 10 Hz. Jitter Number – Filtered to allow jitter only above the filter frequency selected. This number is used by the jitter bar graph (JIT:)
❿	Phase Meters – Embedded, AES, or analog audio.
⓫	Time Readout – VITC Time Code or Real Time Clock (RTC) readout.
⓬	Vector – Vector display.
⓭	Waveform – Waveform display.
⓮	Picture Guard – If PGD is displayed, then Picture Guard is enabled.
⓯	Audio Reference Levels – Full Scale (FS): xx db meter reading and Standard Operating Level (SOL) : xx db meter reading.

Memory Recall

These buttons are used to recall any one of the 14 stored memories. To recall stored memory 1 to 7, press the appropriate Memory Recall button. To recall stored memory 8 to 14, press the **Blue** (2nd) button and then the appropriate Memory Recall button.

Mode

These buttons determine what the monitor displays: Waveform, Picture, Vector, Luminance (Luma), Parade or Alternate (ALT). The following table lists the functions of the Mode buttons.

Button	Function
Waveform	Displays a waveform of a selected signal input. Press the **Waveform** button twice for a two-line display with no line select and no magnification.
Vector	Displays a vector of a selected signal input. Press the **Vector** button twice to view a vector and waveform at the same time.
Picture	Displays a picture of a selected signal input.
Blue + Automeasure	Parade display. Places three signal input waveforms side-by-side for comparison(1).
Blue + Analog	(ALT) Alternate display. Overlays three signal input waveforms for comparison(1).
Blue + Vector	Displays a waveform's luminance frequencies(1).

(1) This display is only available when using an S-video signal input or CPNT mode of a digital signal input (A-SDI or B-SDI).

Refer to Chapter 6, "Viewing Waveforms, Vectors, and Pictures," for more information on these types of displays.

Input Signal

You can select one of the three signal inputs using the **Digital** or **Analog** buttons on the front panel.

The **Digital** button lets you toggle between the A-SDI and B-SDI signal inputs. An LED on the front panel (Figure 4-1) lights and the top line display on the monitor (❸, Figure 4-2) indicates which signal input was selected and is displayed. Note that the selected signal input will also be an output from each of the decoded analog outputs (Y, B-Y, R-Y).

The **Analog** button lets you select either a D-S-video or D- CPST signal input. After selecting a D input, a corresponding LED on the front panel (Figure 4-1) lights and the monitor displays the corresponding signal input as the top line (❸, Figure 4-2). The non-displayed selected digital input is shown on the bottom line (❹, Figure 4-2).

Refer to the section "Mode" for more information on the Blue ALT functions.

Vertical

These buttons let you manipulate and vertically position waveforms on a display monitor. The following table lists the functions of the Vertical buttons and knob.

Button/Knob	Function
Vertical Position	Positions the waveform on a display monitor. Use this knob to move the waveform up or down.
Position	Selects the corresponding component of a parade filter, SDI waveform, or S-video waveform (toggles between position 1, 2, 3, or all three). When used in conjunction with the Vertical Position knob, allows vertical positioning of each waveform. An LED lights when a position is selected.
V Mag	Vertically magnifies a waveform 2.5 times.
Display	Lets you switch between an SDI component (CPNT), composite (CPST), or DIGITAL waveform/vector display. When selected, the corresponding LED lights.
Split Screen	With A-SDI or B-SDI signal input, lets you display a reduced size waveform and vector in a window at the bottom of a picture. With D-S-video or D-CPST signal input, waveforms and vectors are cut into the picture at full size. With Picture Guard, the picture is shown while the automeasure system samples signal parameters. If any of these parameters, such as sync amplitude or peak luminance, are out of tolerance, small sign(s) appear at the bottom of the picture with the name of the out of tolerance parameter(s).

Refer to Chapter 6, "Viewing Waveforms, Vectors, and Pictures," for more information on these types of displays.

Horizontal

These buttons let you manipulate and horizontally position waveforms on a display monitor. The following table lists the functions of the Horizontal buttons and knob.

Button/Knob	Function
Horizontal Position	Positions the waveform on a display monitor. Use this knob to move the waveform left or right. The Horizontal position knob also has a scrolling function when used in magnified sweep or vector phase mode. While in these modes, to continuously scroll a waveform from left to right, turn the knob counterclockwise fast. Once the correct position is reached, turn the knob clockwise or counterclockwise to stop the scrolling. You can now make fine adjustments to the postion of the waveform.
Sweep	Lets you show one line of a signal input (1H) or two lines of a signal input (2H). When selected, the corresponding LED lights. Note that when in 1H mode, the second line of a signal input is to the right and can be seen by turning the Horizontal Position knob.

continued

Button/Knob	Function
Blue + Sweep	Displays two fields of a signal input. When selected, the corresponding LED lights (2F).
Field Sel	Changes the field that triggers the 2F (two field) display. Note that this selection is only noticable in a two-field display or when Line Select is used.
Blue + Field Sel	Displays an externally referenced signal input. When selected, the corresponding LED lights (Ext Ref).
H Mag	Magnifies the sweep horizontally.
Line Sel	Displays two lines from an even or odd numbered field. To choose the line you want to monitor, press the **Line Sel** button and then rotate the Menu knob to the right. When selected, the corresponding LED lights. Note that the selected line is identified by numbers at the top of a display. For example, 1/3:27 means Fields 1 and 3 (odd), Line 27.
Vec Phase	Lets you rotate a vector display using the Menu knob. When selected, the corresponding LED lights.
Var Gain	Reduces a signal input (waveform and vector) by a size factor of 0.7 or increases a signal input (waveform and vector) by a size factor of approximately 1:2. When selected, the corresponding LED lights. You can also use Variable (Var) Gain with V Mag if you need to see a more detailed waveform or vector. When selected, the word GAIN appears at the top-right of the display. **Note:** If you have both Line Select and Vector Phase selected, you can press the buttons back and forth to engage the knob. You can also select Vector Phase, Line Select, and Variable Gain. The corresponding LED indicates which selection the knob can adjust. The display also indicates which selection is active. The first push of the button activates the knob. The second push of the same function deactivates that function.

Refer to Chapter 6, "Viewing Waveforms, Vectors, and Pictures," for more information on these types of displays.

Menu

Two main buttons are available on the front panel Menu: **Config** and **Msmt**. These buttons let you access the *Configure* and *Measurement* menu options that are available for the SDM-560M (see Figure 4-1).

Configure menu options include:

- INPUT
- DISPLAY
- VECTOR
- SERIAL PORTS

- TIME
- REFERENCES
- ALARM SETTINGS
- MEMORIES
- JITTER
- SYSTEM ID

Measurement menu options with A or B input selected include:

- A/B MEASUREMENTS (with an A or B input)
  - A/B CPST Select Set
  - A/B MEAS. SETS LIMITS
  - Response Time
  - Noise Line
  - REPORT

Measurement menu options with D input selected include:

- MEASUREMENT
  - D SELECT SET
  - D MEAS. SETS LIMITS
  - Response Time
  - Noise Line
  - REPORT
  - SC/H Phase Readout
  - Color Frame

  Refer to Chapter 5, "Operating the SDM-560M," for more information about the Config and Msmt menu options.

How the Menu Works

Following are some basic rules about how the menu works.

- You do not have to exit one menu to access another. Each time you access the *Config* or *Msmt* menu, the available selections always start in the top level menu.
- The **Prev Mnu** button lets you see the menu that was previously selected. As you scroll through the menu options, the **Prev Mnu** button moves you to the previous menu. It does not erase any selections you have made.
- The **Clr Mnu** button closes the menu completely. It does not erase any of the selections you have made.

- Any menu option selected takes effect immediately. You must de-select a menu option to erase it.
- A blue, highlighted cursor indicates the place in the menu structure. You can move the cursor using the **Up** and **Down** arrow buttons.
- Menu entries in all capital letters indicate that there are sub-menus below that entry.
- The **Blue** button is used for quick access to the functions available for the SDM-560M. To use the **Blue** button, simply press it and then press the button that relates to the function you want to select.

  Refer to "Quick Access to Commonly Used Functions" for a listing of the Blue button functions.

Choosing Menu Options

You select and choose options in the *Configure* or *Measurement* menu using the associated menu buttons and a knob. You access the *Configure* menu by pressing the **Config** button. You access the *Measurement* menu by pressing the **Msmt** button. You can then use the **Up** and **Down** arrow buttons to move the cursor through the menu selections. The knob is used to make sub-selection adjustments to a menu selection.

Pushing the **Enter** button has two effects, depending on what you have highlighted at the time the button is pressed. Press the **Config** button, select an input, and then press the **Enter** button to see the following example:

- If the blue highlighted cursor is on the *INPUT* menu option that has choices highlighted in white, such as *Slow* and *Off*, pressing the **Enter** button will toggle through these choices (see Figure 4-3).
- Turning the knob also changes the values or selections for menu options. For example, if the blue highlighted cursor is on the *INPUT* menu option that has choices highlighted in white, such as *Slow* and *Off*, rotating the knob will also toggle through these choices.

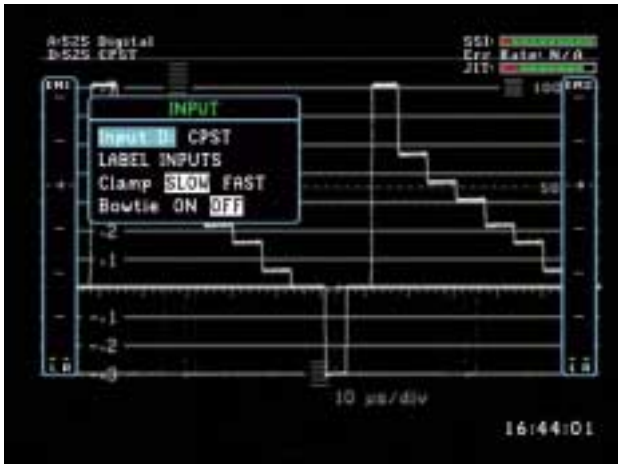


Figure 4-3. Input Screen

You can exit a menu using several methods:

- Pressing the **Prev Mnu** button closes the current menu and moves you back to the previous menu. If you press it enough times, you will exit all menus.
- Pressing the **Clr Mnu** button closes all menus immediately.
- If you are down several layers in the menus, pressing the **Config** button once brings you to the top *Configure* menu. Pressing it again closes the *Configure* menu.

Most menu options that are selected take effect immediately. For example, if you change the *SERIAL A GAMUT LIMITS*, you will see the effect right away as long as you are displaying the limits at that time.

To display the *SERIAL A GAMUT LIMITS* shown in Figure 4-4:

1. Select A-SDI as the input signal.
2. Press the **Msmt** button to access the *Measurement* menu.
3. Select *A/B MEAS. SETS LIMITS, DIGITAL CH A SET*, and then select *SERIAL A GAMUT LIMITS*.
4. Select *NTSC CPST, pk* and then press the **Enter** button.

B:CPST
LINE 2/4:25
SERIAL A GAMUT LIMITS
MEASUREMENT nom LOW nom HIGH
Y 0 -35 700 735 mV GRD
(R-Y), p-p 525 551 mV GRD
(B-Y), p-p 525 551 mV GRD
GBR 0 -35 700 735 mV GRD
PAL CPST, pk 700 735 mV GRD
NTSC CPST, pk 700 735 mV GRD
15:03:35

Figure 4-4. Serial A Gamut Limits Screen

Quick Access to Commonly Used Functions

The **Blue** button provides quick access to certain functions, such as status recall. Note that any **Blue** button function is also available through the main menus.

The options that the **Blue** button can control are the ones in blue boxes on the front panel. To execute any option labeled in a blue box, press the **Blue** button and then the button you want. The following table lists the available options.

Button	Function
Up Arrow	RGB – Displays Red, Green, and Blue (RGB) color bars in the audio meters (❿, Figure 4-2). Right side bars only.
Config	Filter – When displaying a waveform, toggles between None, Luma, Chroma, and Parade filter displays.
Msmt	Jitter – Displays the timing jitter number filtered to 10 Hz. Shows jitter down to 10 Hz (❾, Figure 4-2).
	Displays the filtered jitter number to allow only jitter above the filter frequency (❾, Figure 4-2).
Down Arrow	Display Status On/Off – Shows the selected signal input (❸ and if enabled, ❻ through ❾, Figure 4-2).
Enter	Pix Guard – When in a signal input of A or B, with Digital selected and with picture mode selected or with split screen selected or when in D input with picture mode selected, displays whether or not Picture Guard is enabled (⓮ Figure 4-2, indicator displaying PK VIDEO).
Prev Mnu	Gamut – When in picture or split screen mode, displays whether or not Gamut Brightup is enabled (❶, Figure 4-2).
Clr Mnu	Audio – Toggles the audio meters on and off for the selected signal input. Displays the audio meters that were selected from the *Quick Key* menu option (❿, Figure 4-2).

The **Blue** button also has an escape function under certain conditions. For example, if you quickly press the **Blue** button twice, the following message flashes on the monitor screen:

```
Press Enter for FACTORY RESET
```

CAUTION: Do not press the **Enter** button until you read the following section "Factory Reset." Failure to do so can cause loss of memory data.

Factory Reset

To reset the SDM-560M back to its factory default settings:

1. Quickly press the **Blue** button twice.

   Afterwards the following message appears on the monitor screen:

   ```
   Press Enter for FACTORY RESET
   ```

2. Press the **Enter** button to reset or any other key to cancel the reset.

   If you do not press the **Enter** button after a period of time, the reset is automatically canceled.

Notes

5. Operating the SDM-560M

Introduction

This chapter describes how to operate the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M). By now you should have the SDM-560M installed and configured for your specific needs. Using the information provided in this chapter, you can now select, monitor, automeasure, and report the appropriate display options available in the *Config* (Configure) and *Msmt* (Measurement) menus.

This chapter also describes how to:

- Use intensity and persistence to your advantage
- Control the SDM-560M from a remote location
- Identify waveforms
- Display SC/H phase and time codes
- Get information to and from the SDM-560M
- Print waveforms and vectors
- Use intensity, persistence, and print density controls
- Videotape waveforms
- Recall memory using external switches
- Use the external alarm and memory status

Config Menu

The *Config* menu contains the display portion of the SDM-560M. It lets you view the display, vector, input, time, reference, memory, system ID, alarm settings, and serial port options shown in Figure 5-1. The following sections describe each of the *Config* menu options.

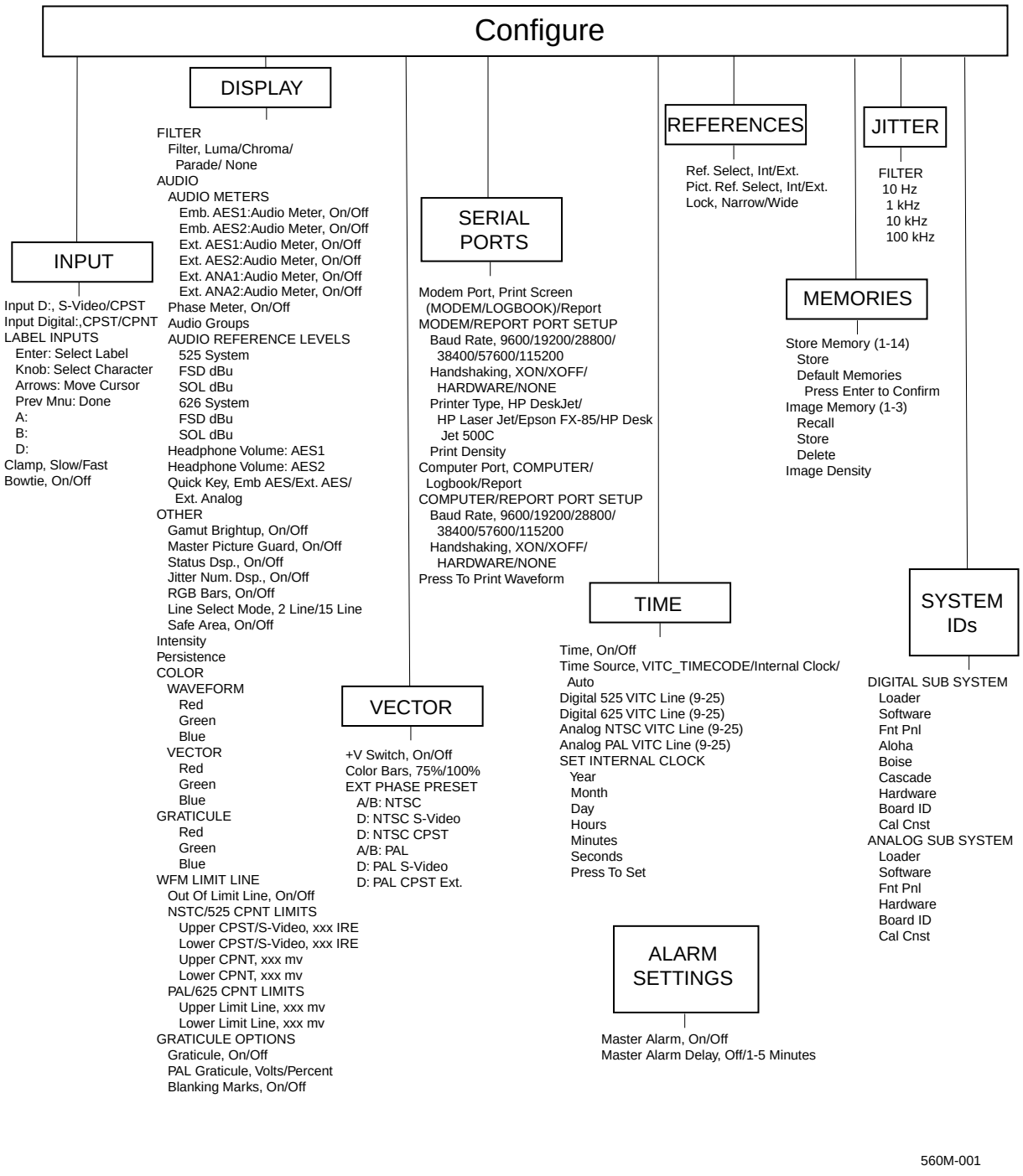


Figure 5-1. Config Menu Options

INPUT Sub-Menu

This section describes each of the *INPUT* sub-menu options.

Input D:

Lets you select either the D-S-video or D-CPST signal input depending on which one was configured using the *Input* menu options.

Input Digital:

Lets you select either a CPST or CPNT waveform display that is configured when *DIGITAL* is selected with the **Display** button.

LABEL INPUTS

Lets you label the line display (❸ and ❹, Figure 4-2) for a selected signal input. If left blank, the signal input lines display the factory defaults.

Clamp:

Lets you switch between a slow or fast clamp to remove low frequency components of a signal.

Bowtie

Lets you turn on/off a bowtie display. Note that this display is applicable only to a component waveform.

DISPLAY Sub-Menu

This section describes each of the *DISPLAY* sub-menu options.

FILTER

Lets you select a Luminance (Luma), Chrominance (Chroma), Parade filter, or None.

AUDIO

AUDIO METERS

Lets you turn on/off meter displays for embedded or external AES1/AES2, external analog I/O, or external AES3 I/O audio.

PHASE METERS

Lets you turn on/off phase meter displays for embedded or external AES1/AES2, external analog, or external AES3 audio.

AUDIO GROUPS

Lets you set which audio group to display on the audio bars and the automeasurement screen. The audio channel appears under the bars and on the measuement report.

AUDIO REFERENCE LEVELS

Lets you set audio reference levels for Full Scale Digital (FSD) and Standard Operating Level (SOL). See Figure 7-1 for more information.

Headphone Volume: AES1/AES2

Lets you see and change the headphone volume level for AES1 or AES2 audio in the form of a horizontal bar graph.

Quick Key

Lets you select the audio (embedded AES audio, external analog I/O, or external AES3 I/O) that was set up through the *Audio* menu options by pressing the **Blue** (2nd) button and then the **Clr Mnu** button.

OTHER

Gamut Brightup (On or Off) – Brightens the portion of the video display where Gamut errors are occuring.

Master Picture Guard (On or Off) – This option a master OFF command for enabled Picture Guard settings. The PGD ON indicator is located at the lower-left of the display screen.

Status Dsp. – Lets you turn on/off the status displays located at the top-left and top-right of the display screen.

Jitter Num. Dsp. – Lets you turn on/off the jitter number display located at the top-right of the display screen.

RBG Bars (On or Off) – Controls the RGB bars display that represents the peak value of the primary colors.

Line Select Mode – Lets you select either a 2 line or 15 line display.

Safe Area – Lets you turn on/off the safe title and safe action areas of a display. Safe title is limited to 90% of the display (no part of the NTSC/PAL display can be closer than 10% to the edge). Safe action is limited to 95% of the screen display (no part of the PAL display can be closer than 5% to the edge).

Intensity

Lets you see and change the intensity level of a display in the form of a horizontal bar graph.

Persistence

Lets you see and change the persistence level of a display in the form of a horizontal bar graph.

Color

WAVEFORM

Lets you select and set Red, Green, and Blue horizontal bar graphs for the WAVEFORM display color.

VECTOR

Lets you select and set Red, Green, and Blue horizontal bar graphs for the VECTOR display color.

GRATICULE

Lets you select and set Red, Green, and Blue horizontal bar graphs for the GRATICULE display color.

WFM LIMIT LINE

Out of Limit Line

Lets you turn on/off the WFM (waveform) out of limit line.

NTSC/525 CNPT LIMITS

Lets you set and display the upper/lower CPST/S-video limits and the upper/lower CPNT limits.

PAL/625 CPNT LIMITS

Lets you set and display the upper/lower CPNT limit lines.

GRATICULE OPTIONS

Graticule – Lets you turn on/off a graticule display.

PAL Graticule – Lets you switch between a volts or percent PAL graticule.

Blanking Marks – Lets you turn on/off the blanking marks of a display.

VECTOR Sub-Menu

This section describes each of the *VECTOR* sub-menu options.

+V Switch

Lets you turn on/off the +V switch for a vector display. When off, a PAL type vector is displayed with 12 boxes. When On, an NTSC type vector is displayed with 6 boxes.

Color Bars

Lets you select between a 75% or 100% color bar display.

EXT PHASE PRESET

Lets you set (by horizontal bar graphs) the external phase presets for the following options to correct each phase-to-graticule:

- A/B: NTSC
- D: NTSC S-Video
- D: NTSC CPST
- A/B: PAL Digital
- D: PAL S-Video
- D: PAL CPST Ext.

SERIAL PORTS Sub-Menu

This section describes each of the *SERIAL PORTS* sub-menu options.

Modem Port

Lets you select PRINT SCREEN, MODEM/LOGBOOK, or REPORT.

If a modem is connected to your SDM-560M, you can use it to transfer measurement report file data and then print it via a remote computer.

MODEM/REPORT PORT SETUP

Baud Rate – Lets you select a baud rate for data transfers between the SDM-560M and a computer. Available baud rates: 9600, 19,200, 28,880, 38,400, 57,600, and 115,200.

Handshaking – If a computer is connected to your SDM-560M, you can select the handshake protocol (Xon/Xoff) or HARDWARE. Otherwise, select *NONE*.

Printer Type – Display the type of printer connected to a computer (HP DeskJet 500C, HP Laser Jet, HP DeskJet, or Epson FX-85.

Print Density – Lets you see the print density of a display in the form of a horizontal bar graph.

Computer Port

Lets you select COMPUTER/LOGBOOK, or REPORT.

If a computer is connected to your SDM-560M, you can use it to store measurement report files or to print out measurement reports.

COMPUTER/REPORT PORT SETUP

Baud Rate – Lets you select a baud rate for data transfers between the SDM-560M and a computer. Available baud rates: 9600, 19,200, 28,880, 38,400, 57,600, and 115,200.

Handshaking – If a computer is connected to your SDM-560M, you can select the handshake protocol (Xon/Xoff) or HARDWARE. Otherwise, select *NONE*.

Press Enter To Print Waveform

Lets you print a waveform when a waveform is selected and the **Enter** button is pressed.

TIME Sub-Menu

This section describes each of the *TIME* sub-menu options. The time selected will be used for all displays.

Time

Lets you turn on/off the time function for a display.

Time Source

Lets you set the source clock of the SDM-560M. The selections are: *VITC_TIME CODE, INTERNAL CLOCK,* and *AUTO SWITCH*.

Digital 525 VITC Line

Lets you select a digital NTSC line for detecting a time code.

Digital 625 VITC Line

Lets you select a digital PAL line for detecting a time code.

Analog NTSC VITC Line

Lets you select an analog NTSC line for detecting a time code.

Analog PAL VITC Line

Lets you select an analog PAL line for detecting a time code.

SET INTERNAL CLOCK

Lets you set the internal clock of the SDM-560M. The selections are: *Year, Month, Day, Hours,* and *Minutes,* and *Seconds*. Select *Press To Set* and then the **Enter** button to save the internal clock settings.

REFERENCES Sub-Menu

This section describes each of the *References* sub-menu options.

Ref. Select (Internal or External)

Lets you select between an internal (INT) or external (EXT) signal reference for synchronization.

Pict. Ref. Select

Lets you select an internal (INT) or external (EXT) signal reference (REF) when any picture is displayed. Note that if you select the *Ref* option, the signal reference will be the same as what was selected in the *Ref. Select* menu option.

Lock

Lets you select a NARROW or WIDE lock for unstable signals.

ALARM SETTINGS Sub-Menu

This section describes each of the *Alarm Settings* sub-menu options.

Master Alarm (On or Off)

Controls the alarm output on pin 1 of the DC CONTROL/ALARM connector (Off, 1 through 4 minutes, or 5 minutes).

Master Alarm Delay (On or Off)

Controls the response dely of the alarm.

MEMORIES Sub-Menu

This section describes each of the *Memories* sub-menu options.

Store Memory

Lets you store up to 14 separate waveform, vector, picture, or factory default memory locations.

Select *Store* and then press the **Enter** button to store the memory settings.

Default Memories

Press the **Enter** button to confirm.

Image Memory

Lets you Recall, Store, and Delete up to 14 separate waveform, vector, or picture memory locations. Select Recall, Store, or Delete and then press the **Enter** button to confirm.

Image Density

Lets you see and set the image density of a display in the form of a horizontal bar graph.

JITTER Sub-Menu

This section describes the *JITTER* sub-menu option.

FILTER

Lets you select a jitter filter value in Hz of 10 Hz, 1 kHz, 10 kHz, or 100 kHz.

SYSTEM IDs Sub-Menu

This sub-menu displays *SYSTEM IDs* information about the SDM-560M.

DIGITAL SUBSYSTEM

Displays the digital subsystem status.

ANALOG SUBSYTEM

Displays the analog subsystem status.

Msmt Menu

The *Msmt* menu contains the measurement portion of the SDM-560M. It lets you view the A/B input (digital) measurement options and the D input (analog) measurement options. The following sections describe each of the *Msmt* menu options.

A/B MEASUREMENT

Lets you select A/B CPST Select Set, A/B MEAS. SET LIMITS, A/B AUDIO MEAS. LIMITS, Response Time, Noise Line, or REPORT (see Figures 5-2 and 5-3). Note that this sub-menu is only available if an A-SDI or B-SDI signal input is selected.

A/B CPST Select Set

Lets you select System Video, Color Setup, Frequency Response, Non Linear or Auto Measure. When Auto Measure is selected the SDM-560M automatically enables the proper measurement set for the line selected in the signal under test. The selected set appears in the upper-left corner of the Automeasure display screen.

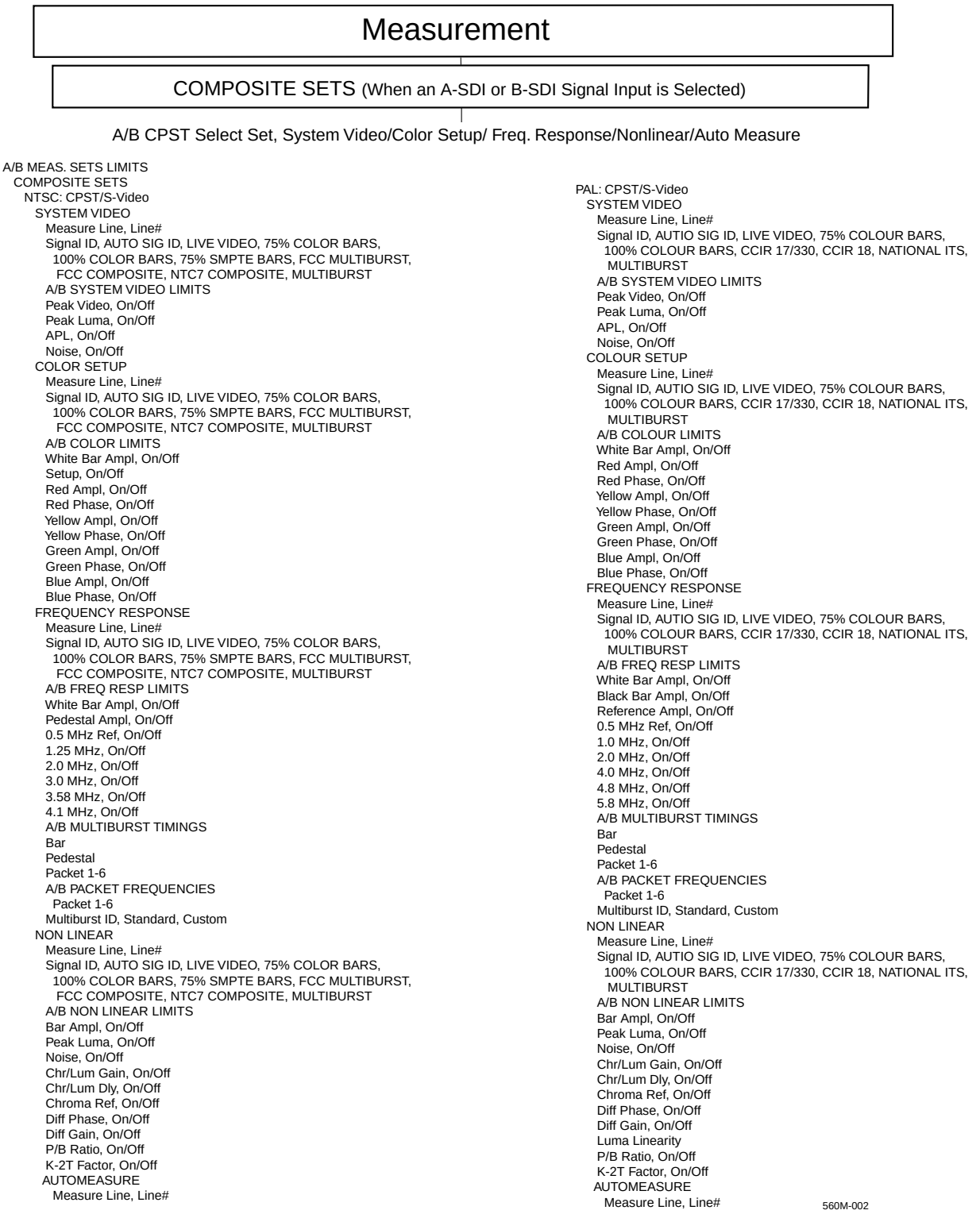

Measurement
COMPOSITE SETS (When an A-SDI or B-SDI Signal Input is Selected)
A/B CPST Select Set, System Video/Color Setup/ Freq. Response/Nonlinear/Auto Measure
A/B MEAS. SETS LIMITS
COMPOSITE SETS
NTSC: CPST/S-Video
SYSTEM VIDEO
Measure Line, Line#
Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST
A/B SYSTEM VIDEO LIMITS
Peak Video, On/Off
Peak Luma, On/Off
APL, On/Off
Noise, On/Off
COLOR SETUP
Measure Line, Line#
Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST
A/B COLOR LIMITS
White Bar Ampl, On/Off
Setup, On/Off
Red Ampl, On/Off
Red Phase, On/Off
Yellow Ampl, On/Off
Yellow Phase, On/Off
Green Ampl, On/Off
Green Phase, On/Off
Blue Ampl, On/Off
Blue Phase, On/Off
FREQUENCY RESPONSE
Measure Line, Line#
Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST
A/B FREQ RESP LIMITS
White Bar Ampl, On/Off
Pedestal Ampl, On/Off
0.5 MHz Ref, On/Off
1.25 MHz, On/Off
2.0 MHz, On/Off
3.0 MHz, On/Off
3.58 MHz, On/Off
4.1 MHz, On/Off
A/B MULTIBURST TIMINGS
Bar
Pedestal
Packet 1-6
A/B PACKET FREQUENCIES
Packet 1-6
Multiburst ID, Standard, Custom
NON LINEAR
Measure Line, Line#
Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST
A/B NON LINEAR LIMITS
Bar Ampl, On/Off
Peak Luma, On/Off
Noise, On/Off
Chr/Lum Gain, On/Off
Chr/Lum Dly, On/Off
Chroma Ref, On/Off
Diff Phase, On/Off
Diff Gain, On/Off
P/B Ratio, On/Off
K-2T Factor, On/Off
AUTOMEASURE
Measure Line, Line#
PAL: CPST/S-Video
SYSTEM VIDEO
Measure Line, Line#
Signal ID, AUTIO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
A/B SYSTEM VIDEO LIMITS
Peak Video, On/Off
Peak Luma, On/Off
APL, On/Off
Noise, On/Off
COLOUR SETUP
Measure Line, Line#
Signal ID, AUTIO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
A/B COLOUR LIMITS
White Bar Ampl, On/Off
Red Ampl, On/Off
Red Phase, On/Off
Yellow Ampl, On/Off
Yellow Phase, On/Off
Green Ampl, On/Off
Green Phase, On/Off
Blue Ampl, On/Off
Blue Phase, On/Off
FREQUENCY RESPONSE
Measure Line, Line#
Signal ID, AUTIO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
A/B FREQ RESP LIMITS
White Bar Ampl, On/Off
Black Bar Ampl, On/Off
Reference Ampl, On/Off
0.5 MHz Ref, On/Off
1.0 MHz, On/Off
2.0 MHz, On/Off
4.0 MHz, On/Off
4.8 MHz, On/Off
5.8 MHz, On/Off
A/B MULTIBURST TIMINGS
Bar
Pedestal
Packet 1-6
A/B PACKET FREQUENCIES
Packet 1-6
Multiburst ID, Standard, Custom
NON LINEAR
Measure Line, Line#
Signal ID, AUTIO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
A/B NON LINEAR LIMITS
Bar Ampl, On/Off
Peak Luma, On/Off
Noise, On/Off
Chr/Lum Gain, On/Off
Chr/Lum Dly, On/Off
Chroma Ref, On/Off
Diff Phase, On/Off
Diff Gain, On/Off
Luma Linearity
P/B Ratio, On/Off
K-2T Factor, On/Off
AUTOMEASURE
Measure Line, Line#
560M-002

Figure 5-2. A/B Measurements (Composite Sets)

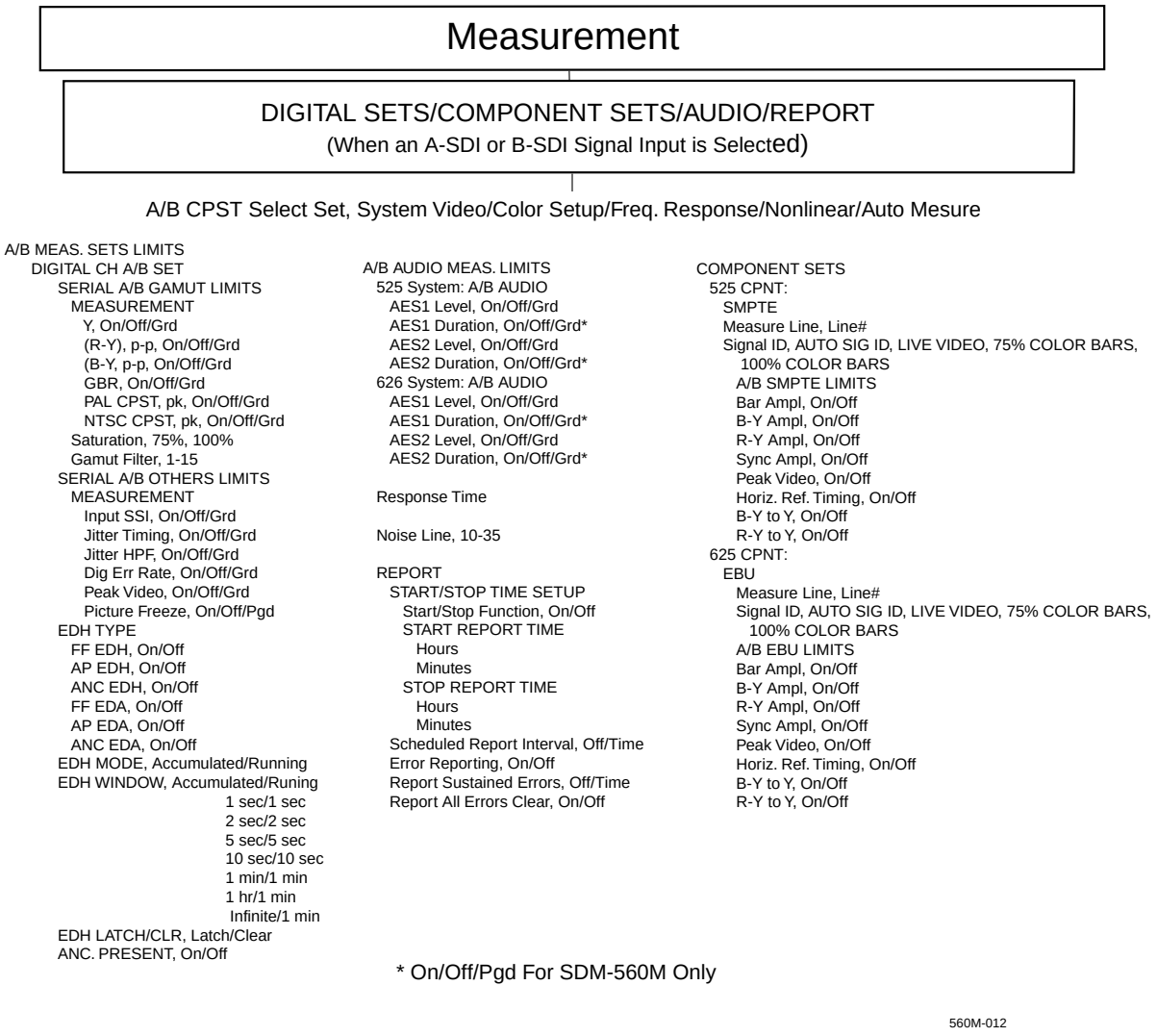


Figure 5-3. A/B Measurements (Component/Digital Set/Audio/Report)

A/B MEAS. SETS LIMITS

Lets you select between COMPOSITE SETS, COMPONENT SETS, DIGITAL CH A SET or DIGITAL CH B set.

COMPOSITE SETS

Lets you select between NTSC: CPST/S-Video or PAL: CPST/S-Video.

NTSC: CPST/S-Video

SYSTEM VIDEO

Lets you select Measure Line, Signal Id, or A/B SYSTEM VIDEO LIMITS.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B SYSTEM VIDEO LIMITS

Lets you select, set limits for, and turn ON/OFF digital system limits for Peak Video, Peak Luma, APL and Noise. Note that nominal values are shown.

COLOR SETUP

Lets you select Measure Line, Signal Id, or A/B COLOR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B COLOR LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Setup, Red Ampl, Red Phase, Yellow Ampl, Yellow Phase, Green Ampl, Green Phase, Blue Ampl, and Blue Phase. Note that nominal values are shown.

FREQUENCY RESPONSE

Lets you select Measure Line, Signal Id, A/B FREQ RESP LIMITS, A/B MULTIBURST TIMINGS, A/B PACKET FEQUENCIES, or Multiburst Id Standard.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B FREQ RESP LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Pedestal Ampl, 0.5 MHz Ref, 1.25 MHz, 2.0 MHz, 3.0 MHz, 3.58 MHz, and 4.1 MHz. Note that nominal values are shown.

A/B MULTIBURST TIMINGS

Lets you select and set times for Bar, Pedestal, and Packet 1-6 for a custom multiburst setting.

A/B PACKET FREQUENCIES

Lets you select and set frequencies for Packet 1-6 for a custom multiburst setting.

Multiburst Id

Lets you select Standard or Custom.

NON LINEAR

Lets you select Measure Line, Signal Id or A/B NON LINEAR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B NON LINEAR LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, Peak Lima, Noise, Chr/Lum Gain, Chr/Lum Dly, Chroma Ref, Diff Phase, Diff Gain, P/B Ratio and K-2T Factor. Note that nominal values are shown.

AUTO MEASURE

Lets you select the line that measurements can be taken on.

PAL: CPST/S-Video

SYSTEM VIDEO

Lets you select Measure Line, Signal Id, or A/B SYSTEM VIDEO LIMITS.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B SYSTEM VIDEO LIMITS

Lets you select, set limits for, and turn ON/OFF digital system limits for Peak Video, Peak Luma, APL and Noise. Note that nominal values are shown.

COLOUR SETUP

Lets you select Measure Line, Signal Id, or A/B COLOUR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B COLOUR LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Red Ampl, Red Phase, Yellow Ampl, Yellow Phase, Green Ampl, Green Phase, Blue Ampl, and Blue Phase. Note that nominal values are shown.

FREQUENCY RESPONSE

Lets you select Measure Line, Signal Id, A/B FREQ RESP LIMITS, A/B MULTIBURST TIMINGS, A/B PACKET REQUENCIES, or Multiburst Id Standard.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B FREQ RESP LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Black Bar Ampl, Reference Ampl, 0.5 MHz Ref, 1.0 MHz, 2.0 MHz, 4.0 MHz, 4.8 MHz, and 5.8 MHz. Note that nominal values are shown.

A/B MULTIBURST TIMINGS

Lets you select and set times for Bar, Pedestal, and Packet 1-6 for a custom multiburst setting.

A/B PACKET FREQUENCIES

Lets you select and set frequencies for Packet 1-6 for a custom multiburst setting.

Multiburst Id

Lets you select Standard or Custom.

NON LINEAR

Lets you select Measure Line, Signal ID or A/B NON LINEAR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B NON LINEAR LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, Peak Luma, Noise, Chr/Lum Gain, Chr/Lum Dly, Chroma Ref, Diff Phase, Diff Gain, Luma Linearity, P/B Ratio and K-2T Factor. Note that nominal values are shown.

AUTO MEASURE

Lets you select the line that measurements can be taken on.

COMPONENT SETS

Lets you select between 525: SMPTE or 626 CPNT: EBU.

SMPTE

Lets you select Measure Line, Signal Id, or A/B SMPTE LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal ID

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the Automeasure display screen.

A/B SMPTE LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, B-Y Ampl, R-Y Ampl, Sync Ampl, Peak Video, Horiz. Ref. Timing, B-Y to Y and R-Y to Y. Note that nominal values are shown.

EBU

Lets you select Measure Line, Signal Id, or A/B EBU LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

A/B EBU LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, B-Y Ampl, R-Y Ampl, Sync Ampl, Peak Video, Horiz. Ref. Timing, B-Y to Y and R-Y to Y. Note that nominal values are shown.

DIGITAL CH A SET or DIGITAL CH B SET

Lets you display either the DIGITAL CH A SET or CH B SET. Note that DIGITAL CH A SET and DIGITAL CH B SET menus are the same except separate for each digital channel input.

SERIAL A or SERIAL B GAMUT LIMITS

Lets you set serial digital input gamut limits for Y, R-Y (p-p), B-Y (p-p), GBR, PAL CPST (pk), and NTSC CPST pk signals. Note that the Serial A Gamut limits are set at the factory at 5% above and below normal. Note that nominal values are shown.

Saturation (75% or 100%)

Lets you select a 75% or 100% saturation level as a reference for measurements. Note that this only changes nominals and not the settings.

Gamut Filter (1 through 15)

Lets you select a filter used for gamut measurements.

SERIAL A or SERIAL B OTHER LIMITS

Lets you display either the serial A or B other limits as follows (note that nominal values are shown):

Input SSI – An input signal in percent of 800 mV. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

Jitter Timing – A timing jitter number filtered to 10 Hz. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

Jitter HPF – A variable jitter number that only allows jitter above the filter frequency selected. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

Dig Err Rate – A digital input error rate. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

Peak Video – Peak video setting. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

Picture Freeze (SDM-560M Only) – Picture freeze setting. Lets you set the detection of a frozen digital picture. The time for indicating a frozen picture can be set from 5 to 10 seconds. The detection can be set to OFF/ON/PGD to allow reporting of the problem or cause a Picture Guard flag to appear.

EDH TYPE

Lets you select and turn ON/OFF FF EDM, AP EDM, ANC EDH, FF EDA, AP EDA, or ANC EDA. The presence of selected EDH types are indicated by icons and in reports. Error rates are only reported if an EDM signal is detected.

EDH MODE

Lets you select ACCUMULATED or RUNNING. EDH MODE sets the displayed error rate tobe ACCUMULATED over the time period and updated each time period or to be a RUNNING window of the set time period with continour update.

EDH WINDOW

Lets you select ACCUMULATED or RUNNING. EDH WINDOW sets the time period over which the EDH errors are measured. The time periods are: 1, 2, 5, 10 seconds or 1 minute for RUNNING. The time periods are 1, 2, 5, 10 seconds, 1 minute, 1 hour, or infinite for ACCUMULATED. EDH Error indicates Acq(uire) until full data for the window is captured. The mode and time period appears along with the error rate in the readout area.

EDH LATCH/CLR

Lets you select LATCHED or CLR. EDH LATCH/CLR lets you latch or display clear the number by pressing the **Entr** button or via remote control.

ANC. PRESENT

Lets you select ON or OFF. ANC.PRESENT lets you turn ON or OFF the ancillary absent flag when no ancillary is present.

A/B AUDIO MEAS. LIMITS

Lets you select 525 System: A/B AUDIO or 625 System: A/B AUDIO.

525 System: A/B AUDIO

Lets you set AES1 and AES2 levels and durations. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

625 System: A/B AUDIO

Lets you set AES1 and AES2 levels and durations. For the SDM-560, the three options are: ON, OFF, and GRD (Picture Guard). For the SDM-560M, the three duration options are: ON, OFF, and PGD.

Response Time

Lets you use the menu knob to set a Response Time.

Noise Line

Lets you select a Noise Line from 10 to 35.

REPORT

Lets you select START/STOP TIME SETUP, Scheduled Report Interval, Error Reporting, Report Sustained Errors, or Report All Error Clear.

START/STOP TIME SETUP

Lets you select Start/Stop Function, START REPORT TIME or STOP REPORT TIME.

Start/Stop Function

Lets you turn ON/OFF the Start/Stop Function.

START REPORT TIME

Lets you select and set Hours and Minutes for Start Report Time.

STOP REPORT TIME

Lets you select and set Hours and Minutes for Stop Report Time.

Scheduled Report Interval

Lets you turn OFF or set the Scheduled Report Interval time in minutes.

Error Reporting

Lets you turn ON/OFF error reporting.

Report Sustained Errors

Lets you turn OFF or set the time (in minutes) of Sustained Errors.

Report All Errors Clear

Lets you turn ON/OFF Report All Errors Clear.

MEASUREMENT

Lets you select D SELECT SET, D MEAS. SET LIMITS, D AUDIO MEAS. LIMITS, Response Time, Noise Line, REPORT, SC/H Phase Readout, and Color Frame (see Figures 5-4 and 5-5). This sub-menu is available only if an D-Analog input is selected.

D SELECT SET

Lets you select between a System Video, Color Setup, Freq. Response, Non-linear, or Auto Measure. When you select Auto Measure, SDM-560M automatically measures a test signal.

D MEAS. SETS LIMITS

Lets you select NTSC: CPST/S-Video Sets, SYSTEM VIDEO, COLOR SETUP, FREQUENCY RESPONSE, NON LINEAR, AUTO MEASURE or PAL: CPST/S-Video Sets, SYSTEM VIDEO, COLOUR SETUP, FREQUENCY RESPONSE, NON LINEAR, AUTO MEASURE.

NTSC: CPST/S-Video SETS

SYSTEM VIDEO

Lets you select Measure Line, Signal Id, D SYSTEM VIDEO LIMITS, or H. Blanking Level.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D SYSTEM VIDEO LIMITS

Lets you select, set limits for, and turn ON/OFF or GRD (Picture Guard), Sync Ampl, Burst Ampl, Peak Video, Peak Luma, APL, Noise, Horiz. Blanking, Horiz. Ref. Timing, Burst Ref. Phase, or SC/H Phase. Note that nominal values are shown.

Measurement

COMPOSITE SETS (When a D-S-Video or D-CPST Signal Input is Selected)

D SELECT SET, System Video/Color Setup/Freq. Response/Nonlinear/Auto Measure

D MEAS. SETS LIMITS
- COMPOSITE SETS
  - NTSC: CPST/S-Video Sets
    - SYSTEM VIDEO
      - Measure Line, Line#
      - Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, MULTIBURST
      - D SYSTEM VIDEO LIMITS
        - Sync Ampl, On/Off/Grd
        - Burst Ampl, On/Off/Grd
        - Peak Video, On/Off/Grd
        - Peak Luma, On/Off/Grd
        - APL, On/Off/Grd
        - Noise, On/Off/Grd
        - Horiz. Blanking, On/Off/Grd
        - Burst Ref. Phase, On/Off/Grd
        - SC/H Phase, On/Off/Grd
    - H. Blanking Level
    - COLOR SETUP
      - Measure Line, Line#
      - Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, MULTIBURST
      - D COLOR LIMITS
        - White Bar Ampl, On/Off
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - Setup, On/Off
        - Red Ampl, On/Off
        - Red Phase, On/Off
        - Yellow Ampl, On/Off
        - Yellow Phase, On/Off
        - Green Ampl, On/Off
        - Green Phase, On/Off
        - Blue Ampl, On/Off
        - Blue Phase, On/Off
    - FREQUENCY RESPONSE
      - Measure Line, Line#
      - Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, MULTIBURST
      - D FREQ RESP LIMITS
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - Bar Ampl, On/Off
      - Pedestal Ampl, On/Off
        - 0.5 MHz Ref, On/Off
        - 1.25 MHz, On/Off
        - 2.0 MHz, On/Off
        - 3.0 MHz, On/Off
        - 3.58 MHz, On/Off
        - 4.1 MHz, On/Off
      - MULTIBURST TIMINGS
        - Bar
        - Pedestal
        - Packet 1-6
      - PACKET FREQUENCIES
        - Packet 1-6
        - Multiburst ID, Standard, Custom
    - NON LINEAR
      - Measure Line, Line#
      - Signal ID, AUTO SIG ID, LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, MULTIBURST
      - D NON LINEAR LIMITS
        - Bar Ampl, On/Off
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - Peak Luma, On/Off
        - Noise, On/Off
        - Chr/Lum Gain, On/Off
        - Chr/Lum Dly, On/Off
        - Chroma Ref, On/Off
        - Diff Phase, On/Off
        - Diff Gain, On/Off
        - P/B Ratio, On/Off
        - K-2T Factor, On/Off
    - AUTOMEASURE
      - Measure Line, Line#
  - PAL: CPST/S-Video Sets
    - SYSTEM VIDEO
      - Measure Line, Line#
      - Signal ID, 75% AUTO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
      - D SYSTEM VIDEO LIMITS
        - Sync Ampl, On/Off/Grd
        - Burst Ampl, ON/Off/Grd
        - Peak Video, On/Off/Grd
        - Peak Luma, On/Off/Grd
        - APL, On/Off/Grd
        - Noise, On/Off/Grd
        - Horiz. Blanking, On/Off/Grd
        - Horiz. Ref. Timing, On/Off/Grd
        - Burst Ref. Phase, On/Off/Grd
        - SC/H Phase, On,Off,Grd
    - H. Blanking Level
    - COLOUR SETUP
      - Measure Line, Line#
      - Signal ID, 75% AUTO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
      - D COLOUR LIMITS
        - White Bar Ampl, On/Off
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - Red Ampl, On/Off
        - Red Phase, On/Off
        - Yellow Ampl, On/Off
        - Yellow Phase, On/Off
        - Green Ampl, On/Off
        - Green Phase, On/Off
        - Blue Ampl, On/Off
        - Blue Phase, On/Off
    - FREQUENCY RESPONSE
      - Measure Line, Line#
      - Signal ID, 75% AUTO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
      - D FREQ RESP LIMITS
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - White Bar Ampl, On/Off
        - Black Bar Ampl, On/Off
        - Reference Ampl, On/Off
        - 0.5 MHz Ref, On/Off
        - 1.0 MHz, On/Off
        - 2.0 MHz, On/Off
        - 4.0 MHz, On/Off
        - 4.8 MHz, On/Off
        - 5.8 MHz, On/Off
      - MULTIBURST TIMINGS
        - Bar
        - Pedestal
        - Packet 1-6
      - PACKET FREQUENCIES
        - Packet 1-6
        - Multiburst ID, Standard,Custom
    - NON LINEAR
      - Measure Line, Line#
      - Signal ID, 75% AUTO SIG ID, LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST
      - D NON LINEAR LIMITS
        - Bar Ampl, On/Off
        - Sync Ampl, On/Off
        - Burst Ampl, On/Off
        - Peak Luma, On/Off
        - Noise, On/Off
        - Chr/Lum Gain, On/Off
        - Chr/Lum Dly, On/Off
        - Chroma Ref, On/Off
        - Diff Phase, On/Off
        - Diff Gain, On/Off
        - Luma Linearity
        - P/B Ratio, On/Off
        - K-2T Factor, On/Off
    - AUTOMEASURE
      - Measure Line, Line#

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Figure 5-4. Measurement (Composite Sets)

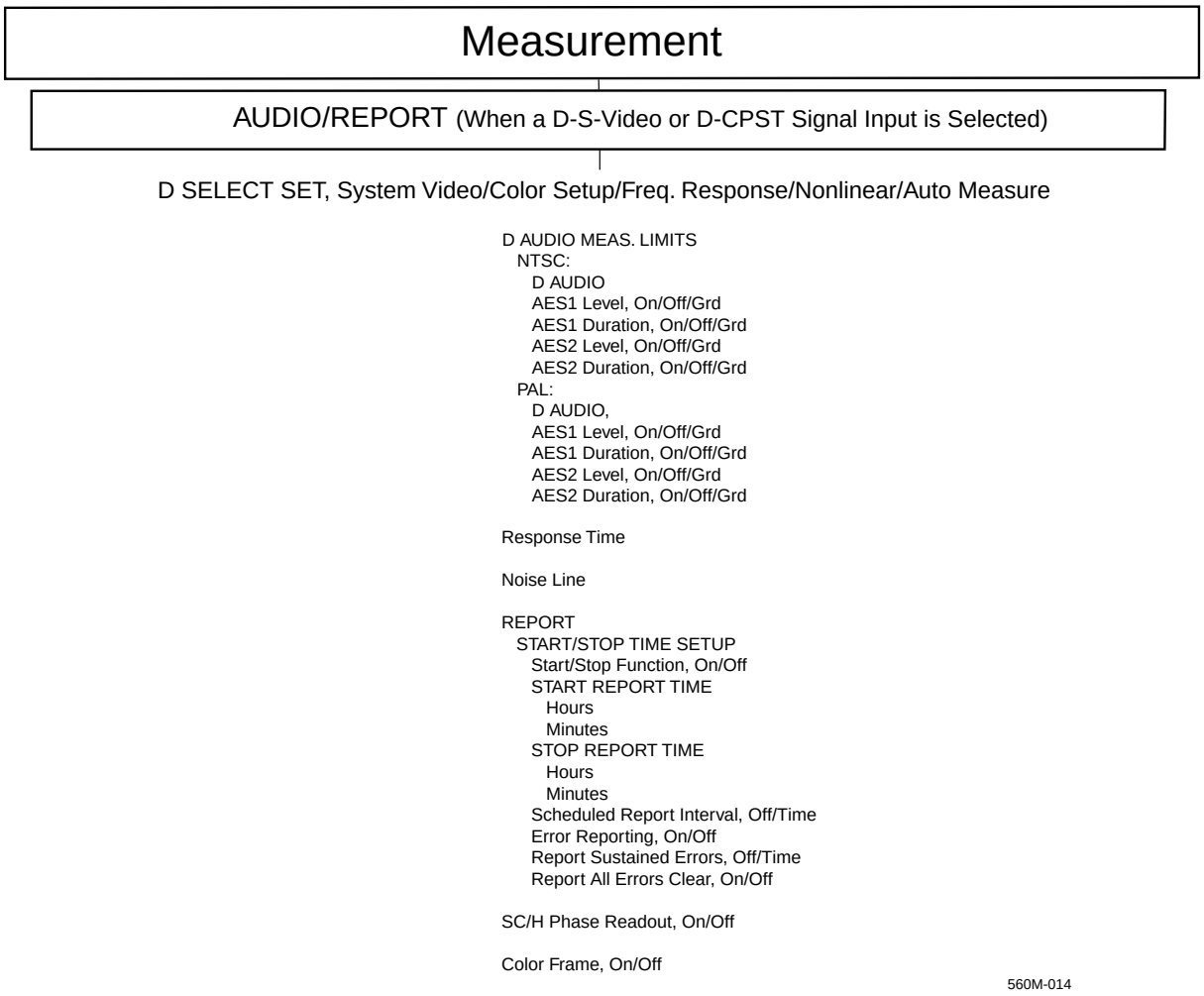

Figure 5-5. Measurement (Audio/Report)

H. Blanking Level

Lets you select and then set a value for the H. Blanking level using the menu knob.

COLOR SETUP

Lets you select Measure Line, Signal Id, or D COLOR LIMITS.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D COLOR LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Sync Ampl, Burst Ampl, Setup, Red Ampl, Red Phase, Yellow Ampl, Yellow Phase, Green Ampl, Green Phase, Blue Ampl, and Blue Phase. Note that nominal values are shown.

FREQUENCY RESPONSE

Lets you select Measure Line, Signal Id, D FREQ RESP LIMITS, MULTIBURST TIMINGS, PACKET REQUENCIES, or Multiburst Id.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D FREQ RESP LIMITS

Lets you select, set limits for, and turn ON/OFF Sync Ampl, Burst Ampl, Bar Ampl, Pedestal Ampl, 0.5 MHz Ref, 1.25 MHz, 2.0 MHz, 3.0 MHz, 3.58 MHz, or 4.1 MHz. Note that nominal values are shown.

MULTIBURST TIMINGS

Lets you select and set times for Bar, Pedestal, and Packet 1-6.

PACKET FREQUENCIES

Lets you select and set frequencies for Packet 1-6 for a custom multiburst setting.

Multiburst Id

Lets you select Standard or Custom.

NON LINEAR

Lets you select Measure Line, Signal Id or D NON LINEAR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOR BARS, 100% COLOR BARS, 75% SMPTE BARS, FCC MULTIBURST, FCC COMPOSITE, NTC7 COMPOSITE, MULTIBURST or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D NON LINEAR LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, Sync Ampl, Burst Ampl, Peak Luma, Noise, Chr/Lum Gain, Chr/Lum Dly, Chroma Ref, Diff Phase, Diff Gain, P/B Ratio and K-2T Factor. Note that nominal values are shown.

AUTO MEASURE

Lets you select the line that measurements can be taken on.

PAL: CPST/S-Video SETS

SYSTEM VIDEO

Lets you select Measure Line, Signal Id, D SYSTEM VIDEO LIMITS, or H. Blanking Level.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D SYSTEM VIDEO LIMITS

Lets you select, set limits for, and turn ON/OFF or GRD (Picture Guard), Sync Ampl, Burst Ampl, Peak Video, Peak Luma, APL, Noise, Horiz. Blanking, Horiz. Ref. Timing, Burst Ref. Phase, or SC/H Phase. Note that nominal values are shown.

H. Blanking Level

Lets you select and then set a value for the H. Blanking level using the menu knob.

COLOUR SETUP

Lets you select Measure Line, Signal Id, or D COLOUR LIMITS.

Measurement Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D COLOUR LIMITS

Lets you select, set limits for, and turn ON/OFF White Bar Ampl, Sync Ampl, Red Ampl, Red Phase, Yellow Ampl, Yellow Phase, Green Ampl, Green Phase, Blue Ampl, and Blue Phase. Note that nominal values are shown.

FREQUENCY RESPONSE

Lets you select Measure Line, Signal Id, D FREQ RESP LIMITS, MULTIBURST TIMING, PACKET FEQUENCIES, or Multiburst ID Standard.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D FREQ RESP LIMITS

Lets you select, set limits for, and turn ON/OFF Sync Ampl, Burst Ampl, White Bar Ampl, Black Bar Ampl, Reference Ampl, 0.5 MHz Ref, 1.0 MHz, 2.0 MHz, 4.0 MHz, 4.8 MHz, or 5.8 MHz. Note that nominal values are shown.

MULTIBURST TIMINGS

Lets you select and set times for Bar, Pedestal, and Packet 1-6 for a custom multiburst setting.

PACKET FREQUENCIES

Lets you select and set frequencies for Packet 1-6 for a custom multiburst setting.

Multiburst Id

Lets you select Standard or Custom.

NON LINEAR

Lets you select Measure Line, Signal Id or D NON LINEAR LIMITS.

Measure Line

Lets you select a line that measurements will be taken on.

Signal Id

Lets you select LIVE VIDEO, 75% COLOUR BARS, 100% COLOUR BARS, CCIR 17/330, CCIR 18, NATIONAL ITS, MULTIBURST, or AUTO SIG ID. When AUTO SIG ID is selected, the SDM-560M automatically detects from the selected line what type of test signal is present. The line number and type of test signal present followed by (Auto) appears in the upper-right corner of the *Auto Measure* display screen.

D NON LINEAR LIMITS

Lets you select, set limits for, and turn ON/OFF Bar Ampl, Sync Ampl, Burst Ampl, Peak Luma, Noise, Chr/Lum Gain, Chr/Lum Dly, Chroma Ref., Diff Phase, Diff Gain, Luma, Linearity, P/B Ratio, or K-2T Factor. Note that nominal values are shown.

AUTO MEASURE

Lets you select the line that measurements can be taken on.

D AUDIO MEAS. LIMITS

Lets you select NTSC: D AUDIO or PAL: D AUDIO.

NTSC: D AUDIO

Lets you set AES1 and AES2 levels and durations. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

PAL: D AUDIO

Lets you set AES1 and AES2 levels and durations. Three options are available for this setting: ON, OFF, and GRD (Picture Guard).

> **NOTE:** Refer to the settings for *Response Time*, *Noise Line*, and *Reports* under *A/B Measurements*. These settings are the same and can be changed under either menu.

Response Time

Lets you use the menu knob to set a response time.

Noise Line

Lets you select a noise line from 10 to 35.

REPORT

Lets you select START/STOP TIME SETUP, Scheduled Report Interval, Error Reporting, Report Sustained Errors, or Report All Error Clear.

START/STOP TIME SETUP

Lets you select Start/Stop Function, START REPORT TIME or STOP REPORT TIME.

Start/Stop Function

Lets you turn ON/OFF the Start/Stop Function.

START REPORT TIME

Lets you select and set Hours and Minutes for START REPORT TIME.

STOP REPORT TIME

Lets you select and set Hours and Minutes for STOP REPORT TIME.

Scheduled Report Interval

Lets you turn OFF or set the Scheduled Report Interval time in minutes.

Error Reporting

Lets you turn ON/OFF Error Reporting.

Report Sustained Errors

Lets you turn OFF or set the time (in minutes) of Sustained Errors.

Report All Errors Clear

Lets you turn ON/OFF Report All Errors Clear.

SC/H Phase Readout

Lets you turn ON/OFF a SC/H phase readout for a display.

Color Frame

Lets you turn ON/OFF a color frame for a display.

Using Intensity and Persistence

Intensity and persistence are set with two controls in the *DISPLAY* menu. To change either one:

1. Press the **Config** button.
2. Select *INTENSITY* and then turn the knob to change it. The bar changes in length and you will see an immediate change in the waveform or vector display.
3. Select *PERSISTENCE* and then turn the knob to change it. You might not see an immediate effect until the waveform or vector itself changes, or until you move them with positioning controls.

Intensity has no effect on the display of the picture or the automeasurement screen. There are also different settings of Intensity and Persistence for 1H and 2H sweeps, magnified or normal, line select, vector, vector magnified, or vector with line select as listed in the following table.

Settings	Plain	H Mag	V Mag	Line Select	H Mag with Line Select
1H or 2H sweep	X	X		X	X
2F sweep	X	X		X	X
Vector	X		X	X	X
Vector with waveform	X	X		X	X

If you turn up the Intensity when viewing a single line that is magnified, you do not change it for a regualr two-line display or for vectors. Each time you change the Intensity or Persistence settings, they will be that way when you next have that same kind of display.

Changing the color of the waveform or the vector affects the intensity of the display, but not the setting of the Intensity control. Turning the three colors for a waveform down lessens the intensity, but it is best to use the three-color controls only to get the hue and then use Intensity to change the density of the trace.

The Intensity and Persistence settings are stored in the memories, but only for the display type used at the time the memory is stored. For example, if you store a line-select vector, the settings for the line-select waveform are not stored in that memory.

The Persistence control can be set to infinity by extending the bar all the way to the right. With this setting, the trace never decays. For example, look at a test signal from a generator. Choose a 1H sweep rate, H Mag, and Line Select. Enter the *DISPLAY* menu so you can change the Persistence. Turn it way down, to the left, and you will see very few dots making up the trace. The SDM-560M is sampling the incoming signal at various randomized points and building a trace. With Persistence turned down, those individual points decay rapidly.

Turn the Persistence all the way up to the right. Now, without touching the front panel controls, change the test signal at the generator. You will see both the old and new signal, because the Persistence is infinite, the old trace did not decay. As soon as you move the waveform or change any control, the old trace disappears and a new trace starts to build.

Controlling the SDM-560M with a Computer

From a remote location, you can control the SDM-560M with a computer. For shorts distances, you can connect directly through the computer's serial port. For greater distances, connect over telephone lines with a modem. Suggestions for applications and general setup are provided in this section. Complete instructions for this type of SDM-560M control can be found in the Logbook Software manual.

To connect at long distances, you need:

- A computer running Windows 3.1, 95, 98, or NT and a modem
- A modem for each SDM-560M
- A telephone number for the SDM-560M modems
- Logbook Software

To connect at short distances, you need:

- A computer running Windows 3.1, 95, 98, or NT with an available serial port
- A 9-pin serial cable
- Logbook Software

To configure the SDM-560M for a modem connection:

1. Connect the SDM-560M using the RS-232/Modem port at the rear panel to an available modem connection (see Figure 3-2).
2. Press the **Config** button.
3. Select *SERIAL PORTS* and then press the **Enter** button.
4. To set the desired configuration, select *MODEM/REPORT PORT SETUP* and then press the **Enter** button.
5. Press the **Clr mnu** button to exit.

To configure the SDM-560M for a direct computer connection:

1. Press the **Config** button.
2. Select *SERIAL PORTS* and then press the **Enter** button.
3. Select *COMPUTER/REPORT PORT SETUP* and then press the **Enter** button.
4. Select *Baud Rate* and then select *9600*.
5. Select *Handshaking* and then select *XON/XOFF*.
6. Press the **Clr mnu** button to exit.

Identifying Waveforms

If you need to measure signals in different standards (composite, SMPTE, GBR, and Beta), you can select a different waveform and vector color for each standard, and then store them in separate memories. Afterwards, when you recall a memory, the SDM-560M switches to the proper video standard and displays the waveform in a distinctive color. To establish colors associated with standards:

1. Press the **Config** button.
2. Select *INPUT* and then press the **Enter** button.
3. Select an input standard for both inputs (both will be saved in memory).
4. Press the **Prev mnu** button.
5. Select *DISPLAY* and then press the **Enter** button.
6. Select *COLOR* and then press the **Enter** button.
7. Select the *WAVEFORM*, *VECTOR*, or *GRATICLE* color and then press the **Enter** button.
8. Select one of the colors and then turn the knob to adjust it. Press the **Prev mnu** button to go back and change the color for another part of the display. You will see the color change, if you are viewing a waveform or vector as you make the changes.
9. Press the **Prev mnu** button until you get back to the *Config* menu.
10. Select *MEMORIES* and then press the **Enter** button.
11. Select *Store Memory* and then turn the knob to select a memory number.
12. Select *Store* and then press the **Enter** button to store the current configuration.
13. Press the **Clr mnu** to exit.

    NOTE: The configuration you store replaces anything previously stored in that memory number.

Another way to identify the signal source is to label the inputs. The labeling system has upper and lower case letters, numbers, and punctuation including µ and ° as listed in the following table. Labels are stored in the memories, one for A and one for B, so you can have up to six pairs of labels stored.

Characters Available for Labeling the Inputs
(Listed in selection order as you turn the knob clockwise)

° % & ‘ ( ) * + , - . / [numerals 0 – 9] : ; < = > ? ± · [capital letters A – Z] ^ _ [lower case letters a – z] [normal space] µ [small space]

To create labels, decide what you want the label to say. You get 12 characters for each label.

1. Press the **Config** button.
2. Select *INPUT* and then press the **Enter** button.
3. Select *LABEL INPUTS* and then press the **Enter** button.
4. Use the **Arrow** buttons to select *A:* and then press the **Enter** button.

5. Turn the knob to select the first character of your label. After it appears in the cursor, press the **Enter** button.
6. When one label is complete, press the **Prev mnu** button and then press an Arrow button to move to the other input.
7. Press the **Enter** button to start a new label.
8. To earse a label and revert to the default label, make sure the first character is a space. You do not need to erase every character. The other characters will remain in the label in the menu, but the label in the display will be the default one.
9. Store this pair of labels in a memory, along with the colors, positions, sweep rate, and video standard for both inputs.
10. Press the **Clr mnu** button to exit.

Displaying SC/H Phase and Time Codes

The label under the waveform always shows the sweep rate. You can add three other items to the label: a measurement of the SC/H phase of composite or S-video signals, a color frame indicator, and a time display (VITC or Internal Clock).

The SC/H and Color Frame readouts give you information about the signal you cannot get from looking at the waveform. These readouts do not appear with vectors or with the combination vector-waveform display. They also do not appear if you display both A and B inputs together. In addition, the SC/H and Color Frame readouts cannot appear if the designated input standard is component; however, the clock display can appear.

The SC/H phase readout, when enabled, appears under the waveform when viewing composite or S-video waveforms. The reading is in degrees, plus or minus.

The Color Frame indicator tells you whether the viewed input and the external reference signal are in the same color frame. When turned on, three possible states exist:

Readout	Meaning
C/F OK	The selected input and external input are in the same color frame.
C/F ERR	They are not in the same color frame.
NO REF	There is no signal at the *Ref. Sel*ect input.

To view the SC/H Phase and Color Frame:

1. Press the **Msmt** button.
2. Select *SC/H Phase Readout* and then press the **Enter** button to turn it on or off.
3. Select *Color Frame* and then press the **Enter** button to turn it on or off.

   If you are viewing a composite waveform from the D analog input at this time, you will see the readout state change immediately.
4. Press the **Clr mnu** button to exit.

The time display in the lower-right corner shows either VITC time code, taken straight from the signal, or the internal clock. To view this display, you have to turn it on, and then select which one you want to display (*VITC_TIME CODE* or *Internal Clock*). If you want to view VITC, the SDM-560M has to know which line has the time code. If you use the internal clock, you have to set the time and date. Note that the date part of the clock is used in reporting; however, it is not displayed on the screen.

To turn these features on and off:

1. Press the **Config** button.
2. Select *TIME* and then press the **Enter** button.
3. Select *TIME* and then press the **Enter** button to turn it on or off. This controls the display of both types of time readout.
4. If you are going to use VITC, use the **Arrow** buttons to select *Digital 525 VITC LINE, Digital 626 VITC LINE, Analog NTSC VITC Line*, or *Analog PAL VITC Line* and then turn the knob until the number of the correct VITC line appears.
5. Select *TIME SOURCE* and then press the **Enter** button to select one of the following:
   - VITC_TIME CODE — the readout will always be VITC Timecode.
   - INTERNAL CLOCK — the readout wil always be the internal clock.
   - AUTO SWITCH — the readout will be VITC if the time code is present on the designated line. Otherwise, it will be the internal clock.

To set the internal clock:

1. Press the **Config** button.
2. Select *SET INTERNAL CLOCK* and then press the **Enter** button.
3. Select each of the parts of the date and time and then rotate the knob to select the current time.
4. Set the time several seconds ahead of the current time and then select *Press To Set*. When that time appears, press the **Enter** button. The internal clock will be set to that time and date, and you will see the time display updated.

Getting Information To and From the SDM-560M

Besides displaying the waveform of the signal on a picture monitor, the SDM-560M has several other features in getting information to and from a computer and printer. These include printing a waveform to a printer, alerting you, with a relay closure, that some measurement value has exceeded its tolerance, letting you know which memory was selected or selecting a memory with a relay closure, and the ability to control the SDM-560M with a computer from a remote site.

The method that offers the most flexibility is to connect the SDM-560M to a computer running Logbook Software. This lets you operate the SDM-560M from a computer as you would from the front panel.

The second method is reporting. A report is a list of measurements sent directly to a computer, running any communications program, or sent to a serial printer. Reports can be generated at set intevals, when there is an error, when errors are cleared, or any combination of these.

Each of these features are explained in the sections that follow.

Printing Waveforms and Vectors

You can print anything you see in an SDM-560M display except the picture. The picture display is not processed in the SDM-560M, so it is not available in digital form.

Before you print, you must connect a printer and then configure the SDM-560M for the printer you want to use. Note that the output to the printer is black and white, even if the waveform is in color.

Connect the printer, using a serial cable, to the SDM-560M's RS-232 Modem connector at the rear panel. To configure the SDM-560M for a printer:

1. Press the **Config** button.
2. Select *SERIAL PORTS* and then press the **Enter** button.
3. Select *MODEM/REPORT PORT SETUP* and then press the **Enter** button.
4. Select *Printer Type* and then press the **Enter** button to select the printer type you have connected.
5. Select *Baud Rate* and then press the **Enter** button to select the printer's baud rate.
6. Select *Handshaking* and then press the **Enter** button to select *XON/XOFF*.
7. To print a waveform, press the **Prev mnu** button, select *Press Enter to Print* and then press the **Enter** button.

Intensity, Persistence, and Print Density Controls

The intensity, persistence, and print density controls all affect a printed image. You can use these controls to emphasize the part of the waveform or vector you want to record.

To see how these controls affect a printed image, think of the video from the SDM-560M consisting of a fine grid placed over a regular CRT waveform monitor and the brightness of the phosphor is read at each grid point.

When a point is read, the setting of the Persistence control determines how much the intensity at that point has decayed since the last time this point was read. The brightness of the display at any point is a function of how many times the video signal has hit that grid point, plus the previous brightness at that point, minus the decay set by the Persistance control.

Look at a vector as an example. A normal color bar vector consists of six points plus the center where the trace spends most of the time and connecting transition lines where the trace spends a much shorter time. At the normal factory setting of Intensity and Persistence, the dots and the transitions appear nearly the same so you can see any irregulrities in the transitions.

If you turn the Intensity and Persistence to their lowest levels, you will see much fainter transition lines, but the dots appear clearly.

Print the vector using several settings of Print Density. At low settings, you will get nothing but the vector graticle. At higher settings the dots appear, and at very high settings the transitions are visible in the print.

Print a waveform of live video. With a low setting for Print Density, none of the chroma or noise is printed. Higher settings print all the noise and chorma. There are times when the printed image needs to show all the noise and chorma, which requires high levels of Intensity, Persistence, and Print Density. There are other times when only the average video level is important, and lower settings are used.

Videotaping Waveforms

Because the output of the SDM-560M is a video signal, you can handle it as you would handle any other video signal. There are two video outputs, both available at the same time: one VHS and one S-video. Note that the output is always NTSC when the input is a 525-line system, and it is always PAL when the input is 625. It is not possible to look at a problem in 625 EBU and record the output on an NTSC VCR.

Memory Recall with External Switches

In some environments it is helpful to have a quick way to recall SDM-560M memories. For example, in a manufacturing environment, where the SDM-560M might not be in a location convenient for a technician, it is helpful to be able to recall specific automeasurement screens with the push of a button.

The SDM-560M's DC CONTROL/ALARM rear panel connector provides this capability. A momentary ground (earth) connection can recall any one of the first four memories as listed in the following table. If you build a switch box to take advantage of this feature, make sure you use momentary switches because if one of the recall pins is held to ground (earth), the SDM-560M's front panel will be locked.

Pin	Description
1	Recall memory 1
2	Recall memory 2
3	Recall memory 3
4	Recall memory 4

External Alarm and Memory Status

An Alarm Out connection is available at the rear panel of the SDM-560M. This connection, pin 5 of the DC CONTROL/ALARM connector, goes to ground (earth) potential (from +5 V dc pull-up) each time an automeasurement screen is displayed that has an out-of-tolerance condition and the *Master Alarm* has been turned on.

To turn the *Master Alarm* on or off:

1. Press the **Config** button.
2. Select *ALARM SETTINGS* and then press the **Enter** button.
3. Select *Master Alarm* and then press the **Enter** button to turn it on or off. Note that the status of this option is one of many items stored in memory.

The *Master Alarm* also goes to ground if Picture Guard is active and one of the enabled measurements goes out of tolerance.

20 Second Delay

When any control setting on the front panel is changed, the *Master Alarm* is disabled for 20 seconds. This prevents the SDM-560M from sending an alarm while it changes from one mode to another. After the 20 second delay, any change in the signal that causes an out of tolerance condition triggers the *Master Alarm* immediately.

Memory Status

The recall of the first three memories is indicated by three separate ground closures in the DC CONTROL/ALARM connector as listed in the following table. For example, when memory 1 is recalled, either from the front panel or remotely by grounding pin 1 of the connector, pin 6 changes from +5 V dc to 0 V dc.

Pin	Description
5	Alarm out
6	Memory 1 out
7	Memory 2 out
8	Memory 3 out
9	Ground (earth)

NOTE: This is not a momentary change of state. The output pin goes to ground (earth) and stays there until another memoruy is recalled, regardless of other changes that might be made from the front panel. Even storing a new configuration in a memory does not change the grounded state of this pin.

Notes

6. Viewing Waveforms, Vectors, and Pictures

Introduction

This chapter shows you how to view waveforms, vectors, and pictures using the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M). Sections included in this chapter are:

- Waveforms:
  - Displaying a waveform
  - Setting a sweep rate
  - Measuring a waveform with the graticule
  - Setting waveform limit lines
  - Switching PAL graticule to percent
  - How to view a selected line
  - Viewing the vertical interval
  - Using filters
- Vectors:
  - Viewing a Vector
  - Controlling the vector display
  - Locking the vector to external sync
  - Comparing two waveforms or vectors
  - Setting waveform and vector images
  - Locking and clamping the signal
- Pictures:
  - Viewing a picture with waveforms
  - Monitoring signal quality with Picture Guard
  - Picture reference when the External Reference (Ext Ref) LED is on

Displaying a Waveform

Pressing the **Waveform** button lets you see a waveform for the selected input signal. Once displayed, you can move and expand it vertically and horizontally using the Vertical/Horizontal (knobs) and **V Mag**/**H Mag** buttons.

Figure 6-1 shows a basic waveform display.

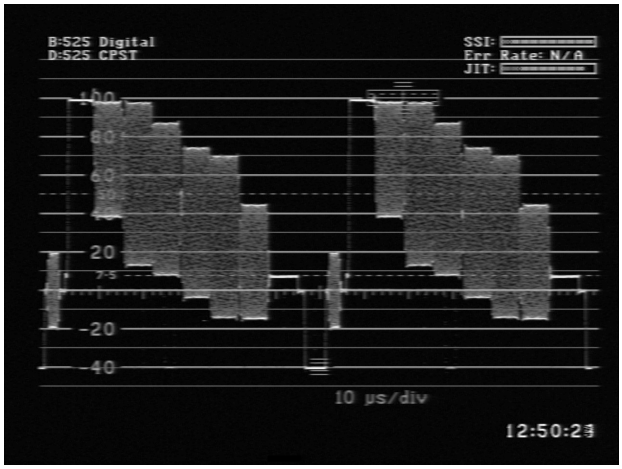

Figure 6-1. Basic Waveform Display

NOTE: Pressing the **Waveform** button twice always results in a two-line display with no line select and no magnification.

Setting a Sweep Rate

The sweep rate is set using the **Sweep** and **H Mag** buttons. Pressing the **Sweep** button changes the sweep rate and the display of the viewed input signal (see Figure 6-2). Three unmagnified sweep rates are available:

- 1H shows one line of the input signal, with the next line off the screen at the right
- 2H shows two lines of the input signal with sync at the center
- 2 Field shows two complete fields of the input signal

NOTE: The **Sweep** button toggles between 1H and 2H. The 2 Field sweep rate is accessed by pressing the **Blue** (2nd) button and then the **Sweep** button.

Under certain situations a 2 Field sweep rate is not available. For example, if you are unable to view filters in Parade at the 2 Field sweep rate but you can see either the Luma or Chroma filter as two fields. Also, you cannot display a vector with a waveform at the 2 Field sweep rate.

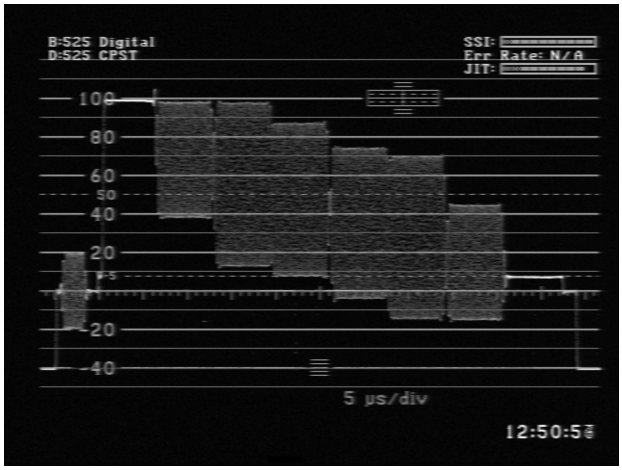

Figure 6-2. 1H Sweep Rate (A-SDI 525 and CPST; for Parade, D CPST)

The following table lists the sweep selections and sweep rates for the SDM-560M.

Sweep Selection	Sweep Rate
1H	5 µ/division (shows one line)
1H Magnified	0.1 µ/division
2H	10/division (shows two lines)
2H Magnified	1 µ/division
2 Field	Shows two fields
2 Field Magnified	Shows two fields expanded
Parade	15 µ/division
Parade Magnified	1 µ/division

Measuring a Waveform with the Graticule

The SDM-560M lets you use special graticules for measuring waveforms. For example, you can turn on amplitude limit lines so that all signal features above and below certain limits show up in red. You can also turn on limit boxes to show where sync and blanking widths should be. If you are using PAL, you can use a waveform graticule in volts or percent.

Using waveform limit lines and horizontal blanking boxes (called Added Marks), you can quickly determine when signals are out of tolerance.

Waveform Limit Lines

Waveform limit lines cause the waveform to turn red each time a portion of it goes outside a pre-determined set of limits. Two specific limits can be set: an upper limit for peak video and a lower limit for sync tip.

When an upper limit is set, the waveform turns red every place the signal exceeds the upper limit, including the vertical limit. For example, if you have a vertical interval test signal, such as modulated ramp, where the chroma or any part of the signal exceeds the upper limit, this area also appears red.

The lower limit includes sync tip, burst, and any part of the input signal that goes below the set limit. If you set the limit above the middle of sync and the bottom of burst, some of the color bars will be red at the bottom of the waveform.

Added Marks

Added marks helps determine various limits in the horizontal interval. Marks include: horizontal sync width, horizontal blanking, and burst amplitude and position. Note that these marks are only visible in 2H Mag and cannot be adjusted.

To see added marks (Figure 6-3):

1. Press the Sweep button until the 2H LED lights.
2. Press the H Mag button to horizontally magnify the sweep.
3. If you do not see the boxes, press the **Config** button to access the *Configure* menu.
4. Select *DISPLAY* and then press the **Enter** button.
5. Select *GRATICULE OPTIONS* to turn on added marks.

Once visible, adjust the waveform vertically so the blanking level rests on the zero graticule line. Position it horizontally so the leading edge of the sync passes through the + mark on the screen. The remaining parts of the signal should be visible as shown in Figure 6-3.

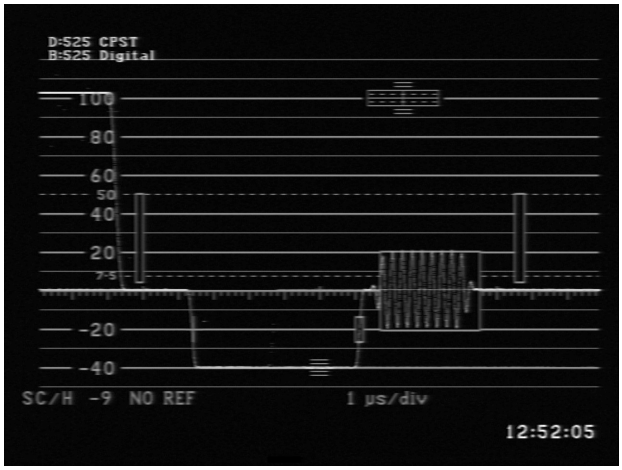

Figure 6-3. Added Marks Box Locations

Setting Waveform Limit Lines

Waveform limit lines show any part of the input signal that goes above or below a pre-determined set of limits. Note that these limits are shown relative to the signal blanking level, not the graticule, so moving the waveform up or down does not move the beginning of the red area (see Figure 6-4).

To set waveform limit line values or to toggle this feature on and off:

1. Press the **Config** button to access the *Configure* menu.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *WFM LIMIT LINE* and then press the **Enter** button.
4. To turn *WFM Limit Line* on or off, turn the knob or select *Out Of Limit Line* and then press the **Enter** button.
5. To set the upper or lower limit line in NTSC or PAL, select either *NTSC LIMITS* or *PAL LIMITS* and then press the **Enter** button.
6. Select the line and then turn the knob to set the limits.

The red limit portion of the display is not affected by the vertical postion of the waveform. However, the limit line border is affected by variable gain. Increasing the variable gain causes either end of the waveform to turn red.

If the limit line feature is on when you switch to vertical magnification, the limit line feature turns off. When you turn off vertical magnification, the limit line comes back on.

Limit lines also work with Luma and Parade filters, but not with the Chroma filter alone. Use caution when working with a Parade filter. In this case, the limit line border is attached to the unfiltered waveform on the left of the display. Moving it separately up and down moves the red border of all three waveforms. In addition, moving the two filtered waveforms separately can move them in or out of the red area.

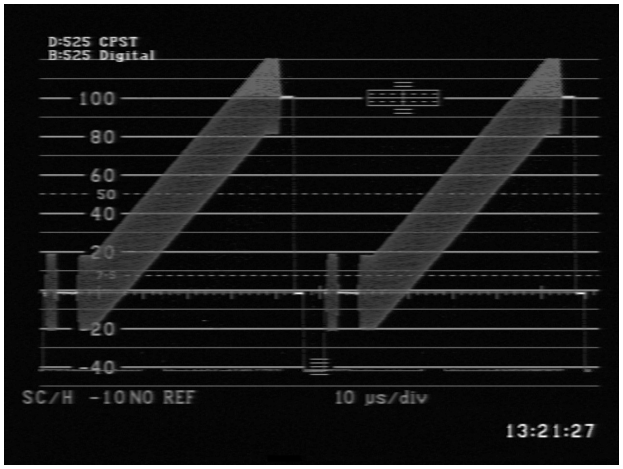

Figure 6-4. Waveform Limit Lines at 70 and –10 IRE

Switching PAL Graticule to Percent

The PAL waveform graticule is scaled, in volts, by default (Figure 6-5). For some measurements you might want to change this option to percent (Figure 6-6). To switch the PAL graticule from volts to percent:

1. Press the **Config** button.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *GRATICULE OPTIONS* and then press the **Enter** button.
4. Select *PAL Graticule*.
5. Press the **Enter** button or turn the knob to highlight either *Volts* or *Percent*.
6. Press the **Clr Mnu** button to exit.

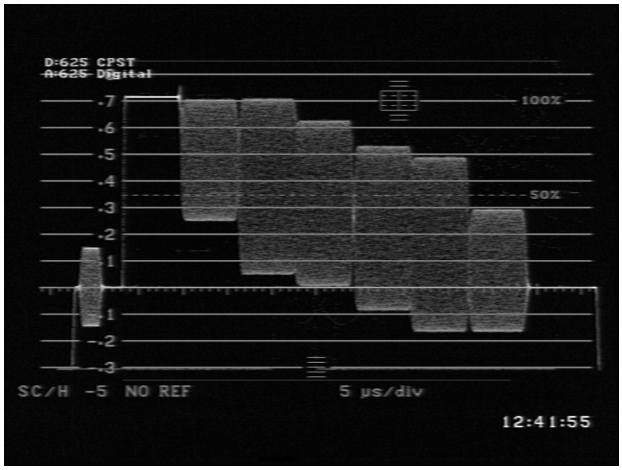

Figure 6-5. PAL Volts Graticule

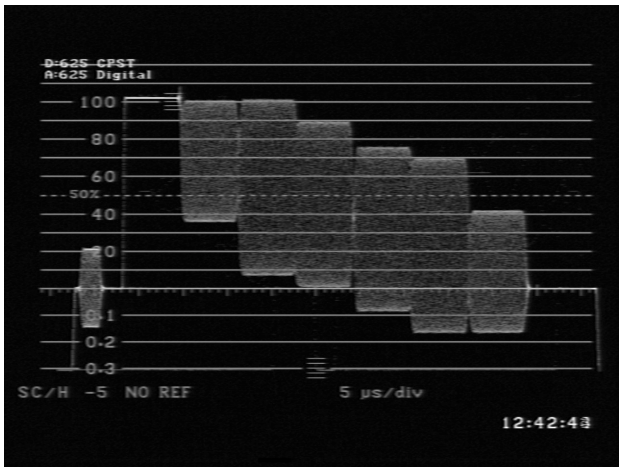

Figure 6-6. PAL Percent Graticule

How to View a Selected Line (Waveform, Vector and RGB Bars)

You use the front panel to view a selected line from an odd field or an even field. The SDM-560M is normally set up to view all lines of the video signal, however, you can change this setting to view any two or 15 lines by pressing the **Line Select** button and accessing the *Configure* menu.

Whether you view one or two lines depends on the sweep rate. In 1H sweep, the display shows the selected line with the next line off to the right of the screen. If you want to view the next line, turn the knob to the right until it appears on the display. In 2H sweep, the selected line is the one on the left of the pair of lines shown.

Each time Line Select is used, a numeric indicator (indicating field and line numbers) appears over the graticule (see Figure 6-7) and a corresponding LED lights indicating that the knob is controlling the line selection. You can change the line number (the number after the colon in the numeric indicator) by turning the knob. Press the **Line Select** button to go back to viewing all lines.

Line select also means field select as well. To change the selected line view from an odd field to an even field, press the **Field Select** button. You can also change to the other field by turning the knob through the vertical interval and into the next field, going in either direction.

> **NOTE:** You cannot view a selected line in all fields at once, nor is it possible to view a line from just one field. Odd fields and even fields are your only choices.

As stated above, the SDM-560M is normally set to Line Select so you can view two lines at a time. To change this setting to view 15 lines:

1. Press the **Config** button.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *OTHER* and then press the **Enter** button.
4. Select *Line Select Mode*.
5. Press the **Enter** button or turn the knob to change between *2-line* or *15-line* modes.
6. Press the **Clr Mnu** button to exit.

The settings for intensity and persistence are different for line select and normal all-lines viewing. The default settings for intensity and persistence are both much higher for line select mode. If you change the intensity during line select, this does not affect the intensity when viewing all lines.

The most efficienty way to use line select is with the two-field display. When you use 2 Field sweep and line select together, the selected lines are brightened in the two-field display.

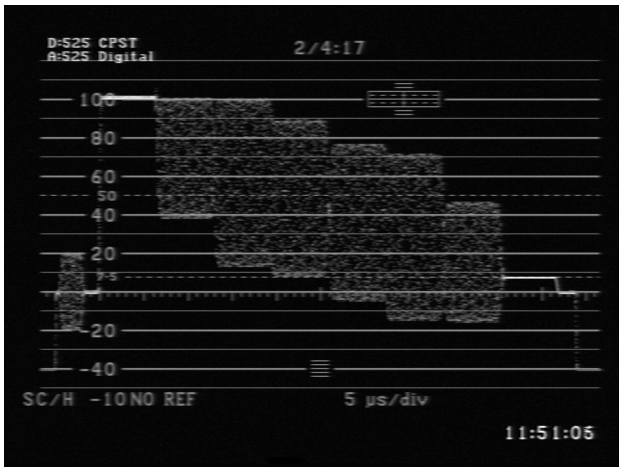

Figure 6-7. Line Select Indicator

Viewing the Vertical Interval

You can view the vertical interval using two methods: 2F sweep (expanded horizontally) and line select (see Figures 6-8 and 6-9). In 2F sweep mode, you can view both fields at once. Expanding this display horizontally (by pressing the **H Mag** button) lets you see the vertical interval. With line select, you can move through the vertical interval viewing each line separately. The indicator at the top of the graticule shows which line you are viewing and from which fields, odd or even.

For best results, you can combine these two methods.

For example:

1. Press the **Blue** button and then the **Sweep** button so the 2F LED lights.
2. Position the waveform so the vertical interval is over the five small sync measurement lines near the bottom center of the graticule.
3. Press the **Line Select** button and then use the knob to brighten a line in the vertical interval.
4. Press the **H Mag** button and position the waveform until you see the desired portion of the vertical interval.
5. Use the knob to brighten the two selected lines. The indicator at the top of the graticule shows the number of the left-hand line and the field number (odd or even).
6. To view the odd or even field, press the **Field Select** button.

7. Press the **H Mag** button to reduce the two-field magnification.
8. Press the **Sweep** button once or twice to view a one-line or two-line display.
9. To go back to viewing the entire vertical interval, press the **Blue** and **Sweep** buttons and then the **H Mag** button.

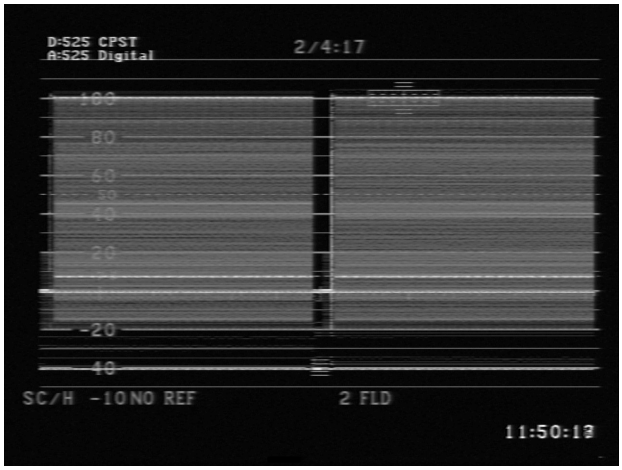

Figure 6-8. 2F Sweep, Mag, Highlighting Lines 17 and 18

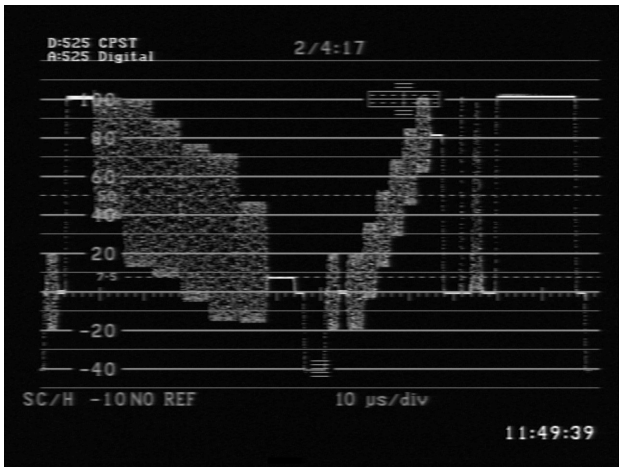

Figure 6-9. 2H Sweep, Line Select on Lines 17 and 18, Even Fields

Using Filters

Filters let you view only a luminance display or a chrominance display. You can parade these waveform displays with the normal or flat waveform to view a signal in three ways at the same time. Paraded filters can also be separated vertically.

NOTE: The luminance display is also available for component signals.

To view the effects of a filter on a composite waveform:

1. Press the **Config** button.
2. Select *DISPLAY* and then press the **Enter** button.

3. Select *FILTER* and then press the **Enter** button to select *Luma*. You can now see the waveform's luminance frequencies. Everything above the chroma burst frequency is suppressed (see Figure 6-10).
4. With *FILTER* still selected, press the **Enter** button to select *Chroma*. You can now see the waveform's chrominance frequencies. Everything below the chroma burst frequency is suppressed (see Figure 6-11).
5. With *FILTER* still selected, press the **Enter** button to select *Parade*. You can now see a parade of the three views of the same signal: flat or no filter, luminance filter, and chrominance filter (see Figure 6-12).
6. With *FILTER* still selected, press the **Enter** button to select *None*. No filter is selected.

NOTE: You can also select a filter by pressing the **Blue** button and then the **Config** button. Each time these buttons are pressed in succession, the SDM-560M will step through and display each of the available filter settings on the monitor.

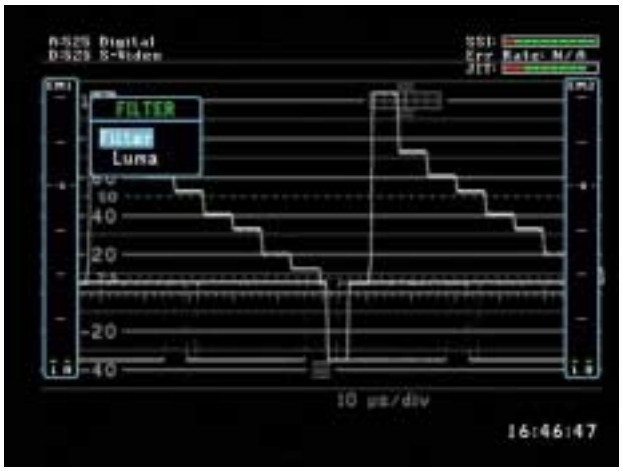

Figure 6-10. Luma Filter on Bars

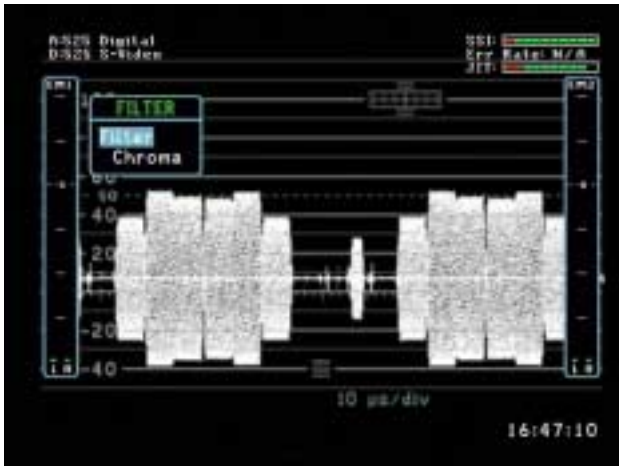

Figure 6-11. Chroma Filter

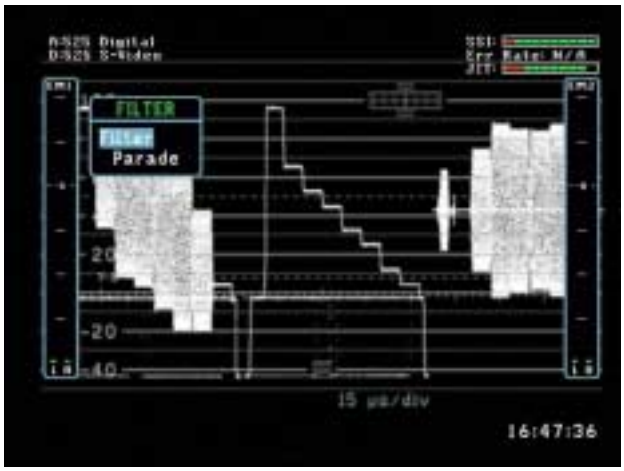

Figure 6-12. Parade of Filters

When you select a filter, the three LEDs next to the **Position** button lights. You can now turn the knob to move all three channels of the signal together. Successively pressing the **Position** button cycles through individual control of the three channels of the signal then back to the vertical control of all three channels again.

In 2F sweep mode, you can use the luma and chroma filters, but you cannot parade them. If you select the A-SDI or B-SDI input signal, you can use the luma filter to be applied to all three component channels.

> **NOTE:** The normal waveform display is actually filtered in the no filter or flat mode (*None* selected) to begin rolling off at 8 MHz. If you want to measure a waveform flat to 10 MHz, change to vector with waveform by pressing the **Vector** button twice.

Displaying a Component Signal

You can display component waveforms in a variety of ways: Y channel only, all three channels superimposed on each other, or three channels paraded. The component waveform mode will be displayed in the SMPTE/525 or EBU/625 format.

When you select the A-SDI input (by pressing the **Digital** button) the A-SDI LED lights and if the CPNT LED is ON (selected by pushing the **Display** button) you see only the Y channel. Press the **Blue** button and then the **Analog** (**ALT**) button to see all three component channels superimposed. Press the **Blue** button and then the **Automeasure** (**Parade**) button to see the three component channels paraded side-by-side.

In alternate or parade mode, you can move the three channels separately. When you first enter either alternate or parade mode, the Vertical Position knob moves all three component channels together. Pressing the **Position** button cycles through each of the component channels and then back to all three. Adjusting the vertical position of one of the component channels in alternate mode has no effect on its position in parade mode.

Component signals can be seen in any of the sweep rates, with the following restrictions:

- In the 2F sweep rate, you can only view at the Y channel.
- In parade mode, the sweep cannot be changed.

You can also see vectors of component signals but not GBR signals. The vector circle in component is more simplified than the composite version because the phase angle does not have any real meaning.

When you view a vector and waveform together, you see only the Y channel of the waveform because the B-Y and R-Y channels are represented in the vector.

Displaying a Bowtie Signal

Bowtie is a specific component video signal used to accurately measure the time delay between the component channels.

Bowtie signals consist of continous sine waves in the three component channels. In the main channel (Y), the sine wave is one frequency. In the other two channels, a slightly higher frequency is used.

The timing of the sine waves are exactly in phase at the center point. Because the Y and B-Y channels have slightly different frequencies, these sine waves are more out of phase as you move away from the center of the signal.

When the B-Y channel is inverted and added to the Y channel, there should be no signal at the center point because they were in phase to start with and are now 180º out of phase. This is the null point. However, as you move away from the center point, the sine waves are still slightly out of phase because they were never in phase to begin with.

Markers in the waveform show exactly where the center point should be and measure off in each direction progressively greater interchannel timing differences. Typically, the markers represent timing differences of 20 ns per mark.

To see a bowtie display:

1. Press the **Config** button.
2. Select *INPUT* and then press the **Enter** button.
3. Select *Bowtie ON* and then press the **Enter** button.

On the screen, you see what looks like a two-line display. The left-half of the display compares the Y channel to the B-Y channel; the right-half shows the Y channel to R-Y channel comparision. The large timing mark in the center shows the correct timing.

Look at the null point (where the bowtie diminishes to almost no amplitude). If this point is to the left of center, the Y channel is leading the other channel. If the null point does not diminish to zero amplitude, it indicates there is a gain inequality between the two channels.

CAUTION: If you see a two-line display that does not look quite right, it might be that the bowtie mode is on, but the incoming component signal is not a bowtie. As a result, an unexpected display might appear on the screen. However, most modes turn off the bowtie mode.

Viewing a Vector

Vectors can be viewed at any time by pressing the **Vector** button (see Figures 6-13 through 6-15). Pressing the **Vector** button twice shows a vector and a waveform together. Unless you changed it, the vector color is always yellow so it can be seen easily with a waveform. Note that the vector rose (the circular graticule for vectors) is simplified when it is displayed with a waveform.

Component signals can also be displayed as vectors. In this case, only the six color boxes are shown and there is no rose. In addition, phase angle measurements have no meaning in component signals, and the Vec (Vector) Phase knob does not operate.

Component signals can be displayed as waveforms with composite signals, but their two vectors cannot be displayed simultaneously.

To select a vector color:

1. Press the **Config** button.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *COLOR* and then press the **Enter** button.
4. Select *Vector* and then press the **Enter** button.
5. Select any of the three colors and then turn the knob to increase or decrease the color in the vector trace.
6. Press the **Clr Mnu** button to exit.

Once selected, the color is applied to all vector traces until you recall a memory that uses a different color. To save the color you just selected:

1. Press the **Config** button.
2. Using the arrow buttons, select *MEMORIES* and then press the **Enter** button.
3. Using the arrow buttons, select *Store Memory*.
4. Using the knob, select the desired memory number (1 through 14).
5. Press the **Down** arrow button to select *Store* and then press the **Enter** button.
6. Press the **Clr Mnu** button to exit.

This process saves the color you just selected as well as these settings: display type, input standard, position, intensity, and whether or not safe area is on or off.

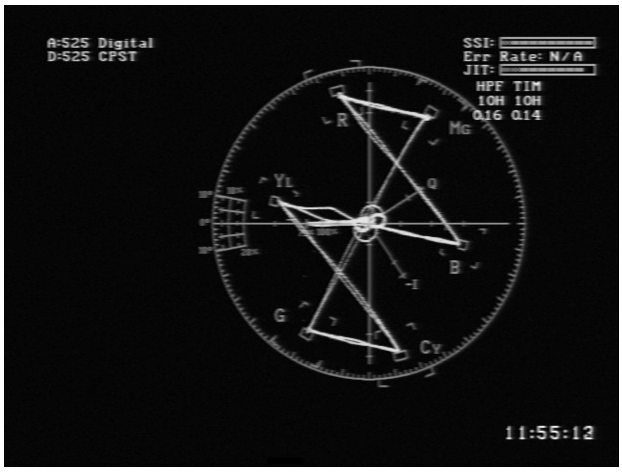

Figure 6-13. Composite Vector

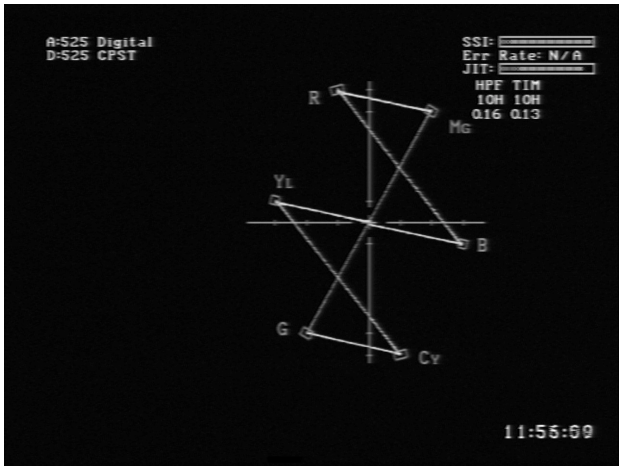

Figure 6-14. Component Waveform and Vector

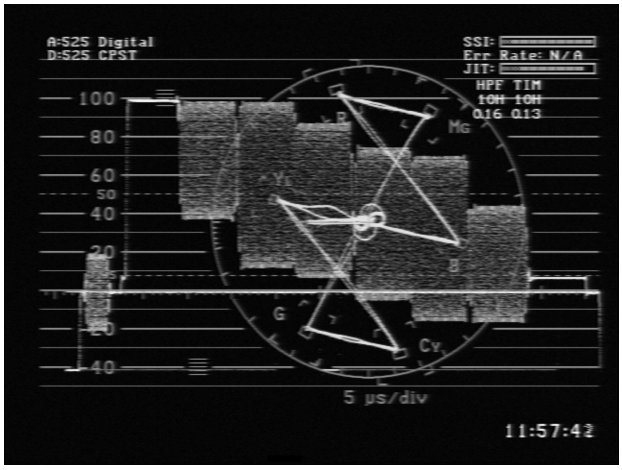

Figure 6-15. Composite Waveform and Vector at 1H Sweep

Controlling the Vector Display

You use the right knob to control the vector display. This switch acts as the variable gain control for vectors as well as waveforms. The switch also has the same scrolling action as the Horizontal Position knob for expanding waveforms.

To rotate the vector display, press the **Vec Phase** button and then turn the knob. The Vec Phase LED lights indicating that the switch is now controlling the vector phase.

To change the gain of the vector, press the **Var Gain** button and then turn the knob. The Var Gain LED lights indicating that the switch is now controlling the vector gain. The word Gain also appears at the lower-center of the display.

To select a line, press the **Line Sel** button and then turn the knob. The Line Sel LED lights indicating that the switch is now controlling the line select option. The line select indicator also appears at the top-center of the display. If desired, press the **Field Sel** button to change to the other field.

You can turn off each of the three variable controls individually or you can recall a memory that does not have any variable controls turned on.

For color bar signals with 100% saturation, switch the vector to 100% as follows:

1. Press the **Config** button.
2. Select *VECTOR* and then press the **Enter** button.
3. Select *Color Bars* and then press the **Enter** button or turn the knob to choose 75% or 100%.

The **V Mag** button magnifies the vector by a factor of 2.5.

PAL composite vectors have a mirror image appearance that sometimes causes difficulty when attempting to interpret the vector (see Figures 6-16 and 6-17). To switch this effect off:

1. Press the **Config** button.
2. Select *VECTOR* and then press the **Enter** button.
3. Select *+V Switch* and then press the **Enter** button or turn the knob to choose on or off.

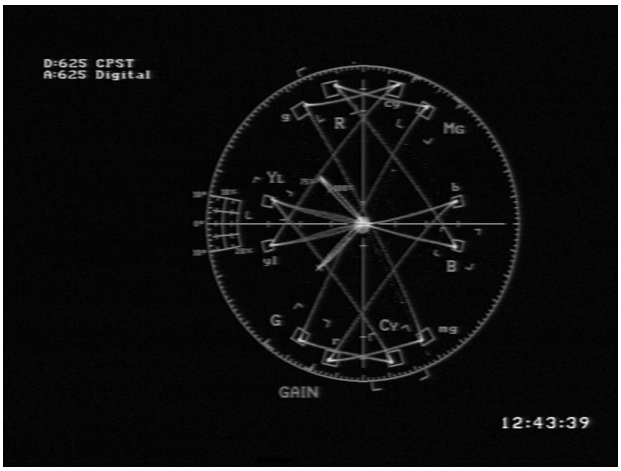

Figure 6-16. PAL Vector Display

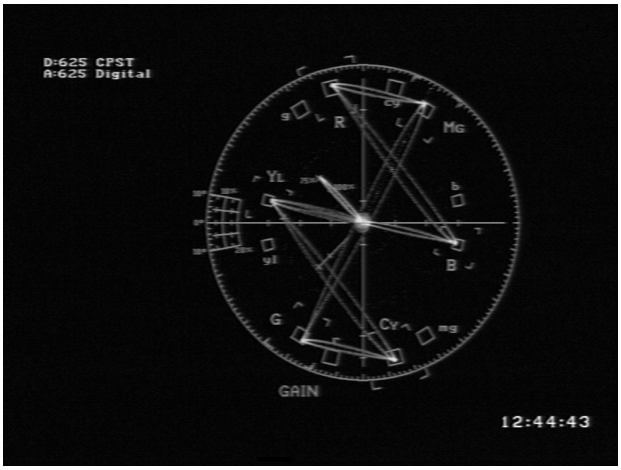

Figure 6-17. PAL Vector with +V Switch

Locking the Vector to External Sync

Vector displays can be locked to an internal or external reference. To lock a vector display to the external sync source, press the Blue button and then press the **Field Sel** (**Ext Ref**) button. Repeat this sequence to go back to the internal reference. When the SDM-560M is externally referenced, the word EXT appears at the top center of the display.

You can also change to the external reference using the menu path of: *Config*, *References*, *Ref. Select*, and then select *Int* or *Ext*.

When the vector display is externally referenced, note that the burst vector does not lie along the 180º line. You can rotate this display using the right knob or you can preset the rest position of the external sync as follows:

NOTE: The reference must set to external to adjust external phase preset.

1. If *Ref* is not *Ext*, select it and then press the **Enter** button.
2. Press the **Config** button.

3. Select *VECTOR* and then press the **Enter** button.
4. Select *EXT PHASE PRESET* and then press the **Enter** button.
5. Turn the knob to preset the vector's position using the horizontal bar graphs.

When setting external phase preset, the knob will not scroll or spin the vector as it can do with the Vec Phase control. The external phase preset applies to both A-SDI and B-SDI inputs; there is not a separate preset for each input.

Saving Waveform and Vector Images

The SDM-560M has space to save up to 14 waveform or vector images. Before saving an image, keep the following in mind:

- You can save the image of a waveform or a vector or a waveform and vector together.
- The graticule is not saved with the image.
- You cannot move the position of the recalled image.
- Pictures cannot be saved.
- You can save the split screen reduced size image, but only the small waveform and vector will be stored, not the picture.

To save an image:

1. Press the **Config** button.
2. Using the arrow buttons, select *MEMORIES* and then press the **Enter** button.
3. Select *Image Number* and then turn the knob to slect an image storage number from 1 to 3. This number is used for *Store, Recall,* and *Delete*.
4. To store an image, select *Store* and then press the **Enter** button. As the image is being stored, you will see a digitizing sign with a progress bar. Afterwards, you will see *Image Stored* displayed.

   NOTE: You will not be warned if you store an image where another one is already stored. The new image replaces the old image.

To delete an image, select the image number, select *Delete* (in the *MEMORIES* menu) and then press the **Enter** button. Note that you do not have to delete an image to store another one in the same image memory.

To recall an image, select the image number, select *Recall* (in the Memories menu) and then press the **Enter** button.

When you recall an image, you get what was last stored at that location or nothing (if no settings were ever stored).

Use the *Image Density* control in the *MEMORIES* menu to change the brightness of the image. You must do this before storing it. After the image is stored and recalled, the brightness cannot be changed.

Locking and Clamping the Signal

The following sections describe how to lock and clamp a signal.

Locking the Signal

The SDM-560M lets you lock the signal in two ways:

- Narrow – used for normal high-quality signals.
- Wide – used for VCR outputs and other unstable signals.

You can also lock the signal to external sync form a sync source or another signal.

Some signal sources have inherently poor stability, such as the video from consumer-grade VCRs. The SDM-560M lets you lock to these unstable signals by switching from narrow locking to wide.

If you find a signal display that jitters back and forth horizontally, use the following procedures to switch to a wide lock:

1. Press the **Config** button.
2. Select *REFERENCES* and then press the **Enter** button.
3. Select *Lock* and then press the Enter button or turn the knob to change from *Narrow* to *Wide*.
4. Press **Clr Mnu** to exit.

The signal can also be locked to an external reference. Pressing the Blue button and then the **Field Sel** (**Ext Ref**) button changes from one reference to the other.

You can also change to the external reference using the menu path of: *Config*, *REFERENCES*, *Ref. Select*, and then select *Int* or *Ext*.

Clamping the Signal

The SDM-560M also allows two types of clamping: Fast and Slow. Fast clamping removes low frequency components of a signal, such as a 50 or 60 Hz hum. Slow clamping does not remove this hum.

NOTE: The signal display is always clamped to remove dc voltages.

To change clamp speed:

1. Press the **Config** button.
2. Select *INPUT* and then press the **Enter** button.
3. Select *Clamp* and then press the **Enter** button or turn the knob to change between *Slow* and *Fast*.

Viewing a Picture with Waveforms

Most waveform montors do not let you view a picture. The SDM-560M not only lets you view a picture, but also shows you a safe title area and lets you view a waveform, vector, and picture all at the same time (Figure 6-18). As a result, you are able to monitor the signal parameters you select to make sure they stay within the tolerances you set.

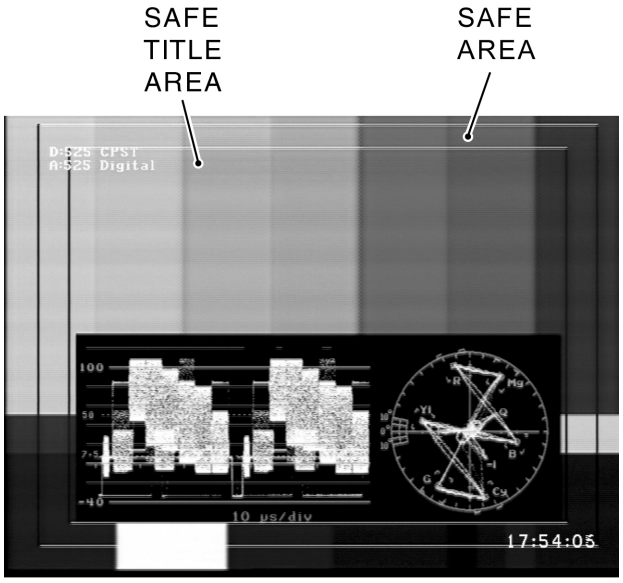

Figure 6-18. Safe Title Area

Pressing the **Split Screen** button lets you view a picture with a waveform and a vector. If a digital signal input is selected (A-SDI or B-SDI), the picture is reduced in size so that the full picture is displayed with the waveform and vector (see Figure 6-19). If an analog signal input is selected (D-S-video or D-CPST), the waveform and vector are cut into the picture (see Figure 6-20).

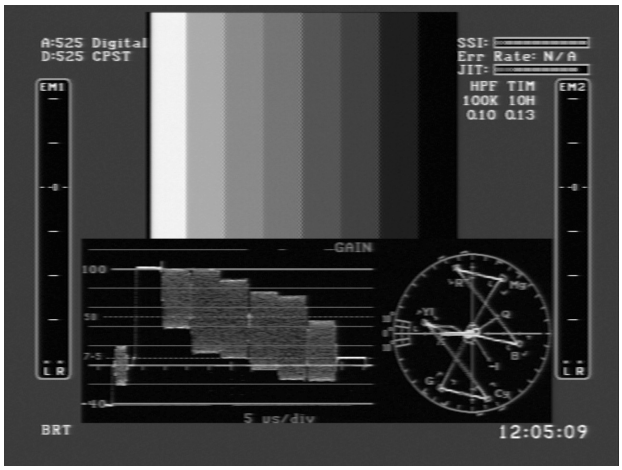

Figure 6-19. Reduced Size Picture Display

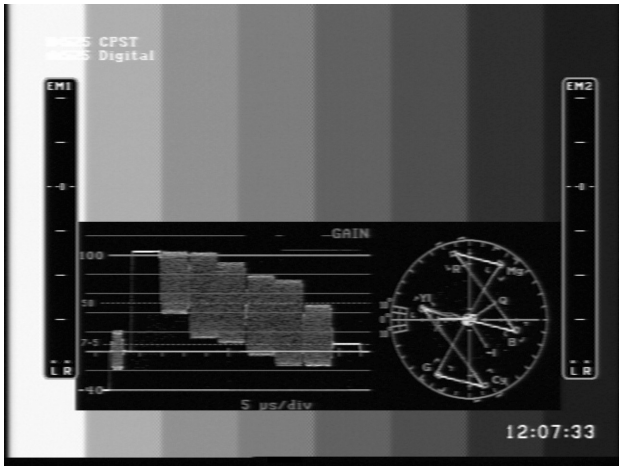

Figure 6-20. Picture Display with Waveform/Vector Cut In

Monitoring Signal Quality with Picture Guard (SDM-560M Only)

Picture Guard lets you watch a picture while monitoring certain signal elements or parameters. You can separately enable and disable up to 11 measured items of video picture signal integrity and four of the audio signal integrity. A 12th monitored item, TRS with Picture Guard, is always on and cannot be disabled. These items are found in the *Msmt* menu screens. If one of the parameters goes outside the tolerances you set, a small, rectangular sign pops up on the picture telling you which parameter has an error (see Figure 6-21).

With Master Picture Guard ON and A or B serial data input in Digital selected, you can activate Picture Guard by pressing the **Picture** or **Split Screen** button. If the D analog input is selected with Picture Guard ON, pressing the **Picture** button activates Picture Guard. Note that Picture Guard can only be activated in these modes.

To activate Picture Guard:

1. Press the **Config** button.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *OTHER* and then press the **Enter** button.
4. Select *Master Picture Guard* and then press the **Enter** button or turn the knob to switch between *On* or *Off*.
5. Press **Clr Mnu** to exit.

All the parameters that are monitored by Picture Guard can be found in sub-menus of the *Msmt* menu. For an A-SDI or B-SDI input signal, select *SERIAL A (*or *B) GAMUT LIMITS MEASUREMENT*, *SERIAL A (*or *B) OTHER LIMITS MEASUREMENT*, or *A/B AUDIO*. For a D analog input signal, select *D SYSTEM VIDEO LIMITS* or *D AUDIO*.

To see these lists for an A-SDI or B-SDI signal input:

1. With an *A-SDI* or *B-SDI Input* selected, press the **Msmt** button.
2. Select *A/B MEAS. SETS LIMITS* and then press the **Enter** button.
3. Select *DIGITAL CH A SET* or *DIGITAL CH B SET* and then press the **Enter** button.
4. Select *SERIAL A GAMUT LIMITS* then alternately select *SERIAL A OTHER LIMITS* and then press the **Enter** button.
5. Press **Clr Mnu** to exit.

To see these lists for a D analog signal input:

1. With a *D Analog Input* selected, press the **Msmt** button.
2. Select *D MEAS. SETS LIMITS* and then press the **Enter** button.
3. Select *SYSTEM VIDEO* and then press the **Enter** button.
4. Select *D SYSTEM VIDEO LIMITS* and then press the **Enter** button.
5. Press **Clr Mnu** to exit.

To see the list for Picture Guard for audio parameters, select the *A/B AUDIO* and *D AUDIO Msmt* sub-menus.

NOTE: Picture Guard always uses the parameters from the previously listed menus. All auto measurement screens do not use these same parameters. Picture Guard parameters remain the same for all auto measurement screens unless changes in the previously listed menus.

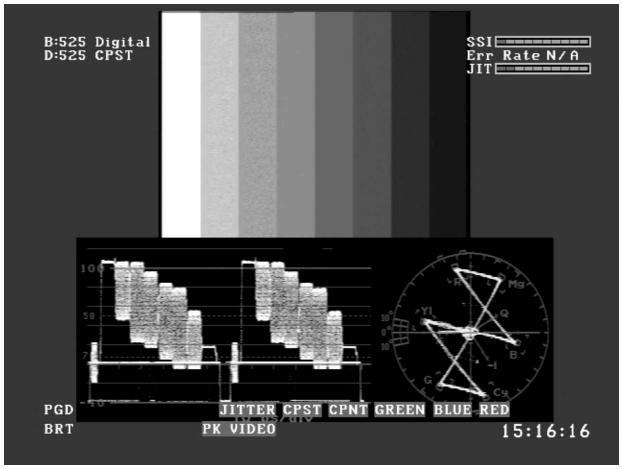

Figure 6-21. Picture Guard Out-of-Tolerance Display Locations (SDM-560M Only)

Ref. Select

The picture is normally referenced to itself when displayed, even if the SDM-560M is set to *Ext Ref*. This prevents the picture from shifting up and down, left and right, if the timing of the external sync is different from the displayed signal. To change the picture to external sync:

1. Press the **Config** button.
2. Select *REFERENCES* and then press the **Enter** button.
3. Select *Ref Select* and then press the **Enter** button to change between *Int* and *Ext*.

The reference for the picture will now follow the main reference, whether its internal or external. The menu line just below this reference is the same one you change when you press the **Blue** (2nd) button and then the **2 Field** button.

NOTE: When a vector is displayed with a picture, the picture reference always goes to internal, regardless of the setting of *Ref Select*.

Picture Reference When the Ext Ref LED is On

Picture mode can be an internal reference or it can follow an internal/external reference. When set to internal, the SDM-560M always switches to an internal reference each time a picture is displayed.

Each time the SDM-560M is internally referenced (Ext Ref LED off), the locking source for the waveform, vector, or picture display is the signal itself.

Each time the SDM-560M is externally referenced, the Ext Ref LED lights and the waveforms and vectors are locked to the signal coming in from the Ext Ref connector at the rear panel. The picture reference can follow the Ext Ref LED, or it can remain locked to internal. To change a picture reference:

1. Press the **Config** button.
2. Select *REFERENCES* and then press the **Enter** button.
3. Select *Pict Ref Select* and then press the **Enter** button to switch between:

- *INT* – the picture will always be referenced to itself
- *REF* – the picture reference will be determined by the state of the Ext Ref LED

4. Select *Ref. Select* and then press the **Enter** button to switch between *INT* and *EXT*.
5. Press the **Clr Mnu** button to exit.

NOTE: If a waveform/vector is displayed with a picture, the waveform and vector will follow the picture reference.

Notes

7. Audio

Introduction

In addition to displaying and monitoring video, the SDM-560M Serial Digital/Composite Video Signal Monitor (SDM-560M) also lets you:

- Set audio reference levels
- Display audio meters
- Adjust headphone volume
- Display phase meters
- Add audio measurements and limit reporting

AUDIO

The SDM-560M supports three different audio formats:

- SDI AES-3 Embedded Audio (2x AES-3 channels)
- External Digital AES-3 (2x AES-3 channels)
- External Analog (4 channels)

For all users, you must set the Audio Reference Levels to match your system so that:

1. The audio meters correctly display the audio amptitudes.
2. The audio amplitudes measurements are correct.
3. The decoded analog output from the embedded digital and the external digital AES audio are decoded correctly.

Typical system settings are:

Description	NTSC	EBU/PAL
Full Scale Digital (FSD)	24 dBu	22 dBu
Standard Operating Level (SOL)	4 dBu	4 dBu
Headroom	20 dBu	18 dBu

Refer to chapter 2, "Product Overview," for detailed descriptions and the locations of the SDM-560M rear panel audio connectors.

AUDIO REFERENCE LEVELS

You can set the audio reference level for 0 reference mark (see Figure 7-1). This standard operating level (SOL or Ref) has a range from 0 to 8 dBu. The Full Scale Digital (FSD) can also be set over a range of 12 to 28 dBu. The audio meter indicator turns yellow above the 0 reference mark and red when the level exceeds 8 dBu above this set reference mark. The horizontal marks in the audio meter represent 10 dBu increments. Note that the dBu unit is the same as dBm.

To change an audio meter reference level, follow these steps:

1. Press the **Config** button to access the *Configure* menu.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *AUDIO* and then press the **Enter** button.
4. Select *AUDIO REFERENCE LEVELS* and then press the **Enter** button.
5. Select the desired audio reference level(s) and then turn the knob to set the appropriate level(s).
6. Press the **Clr Mnu** button to exit.

The settings now appear above the left audio bars. The standard settings for 525 are SOL = 4 and FSD = 24. The standard settings for 625 are SOL = 4 and FSD = 22.

NOTE: When an input is displayed, the audio standards automatically change to match that input standard.

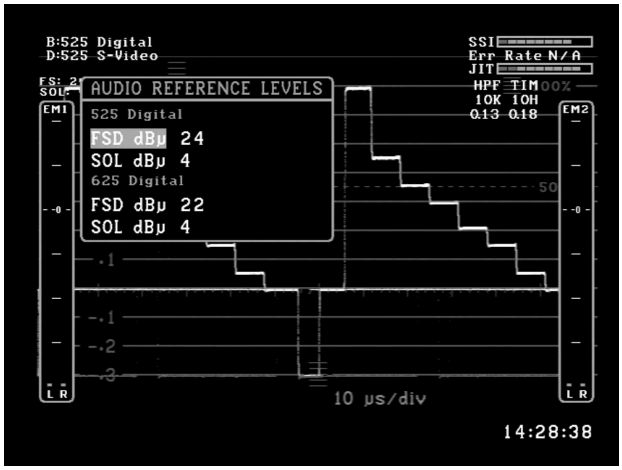

Figure 7-1. Audio Reference Levels Display

AUDIO METERS

Audio meters can be turned on or off using the *AUDIO METERS* menu option (or the audio meters that were selected using the Quick Key menu option) can be turned off by pressing the **Blue** (2nd) button and then the **Clr Mnu** button. Once selected, the audio meter appears at the left and right of all monitor displays.

To make changes to any of the audio meter options, follow these steps:

1. Press the **Config** button to access the *Configure* menu.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *AUDIO* and then press the **Enter** button.
4. Select *AUDIO METERS* and then press the **Enter** button. Figure 7-2 shows the *Audio Meter* menu options.
5. Select the desired audio meter(s) and then press the **Enter** button to select *ON* or *OFF* for each audio meter.
6. Press the **Clr Mnu** button to exit.

NOTE: Only one or one pair of the same type of audio meters can be enabled at a time. Also, to turn on or turn off the audio meter display, press the **Blue** (2nd) button and then the **Clr Mnu** button.

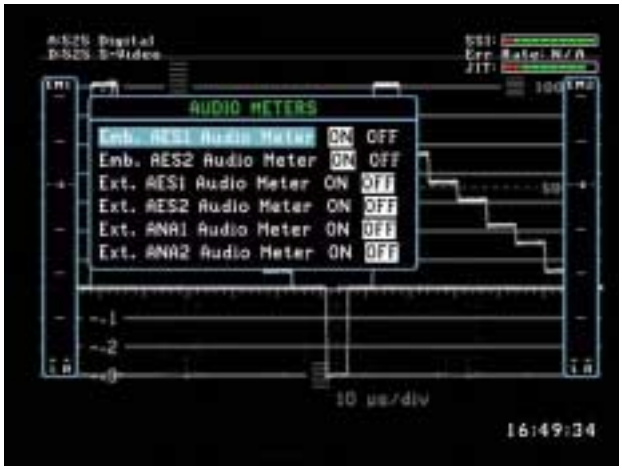
AUDIO METERS
Emb. AES1 Audio Meter ON OFF
Emb. AES2 Audio Meter ON OFF
Ext. AES1 Audio Meter ON OFF
Ext. AES2 Audio Meter ON OFF
Ext. ANA1 Audio Meter ON OFF
Ext. ANA2 Audio Meter ON OFF
10 us/div
16:49:34

Figure 7-2. Audio Meter Display

Adjusting Headphone Volume

To adjust headphone volume, follow these steps:

1. Press the **Config** button to access the *Configure* menu.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *AUDIO* and then press the **Enter** button.
4. To change the volume, select the appropriate headphone volume option and then turn the knob (see Figure 7-3).
5. Press the **Clr Mnu** button to exit.

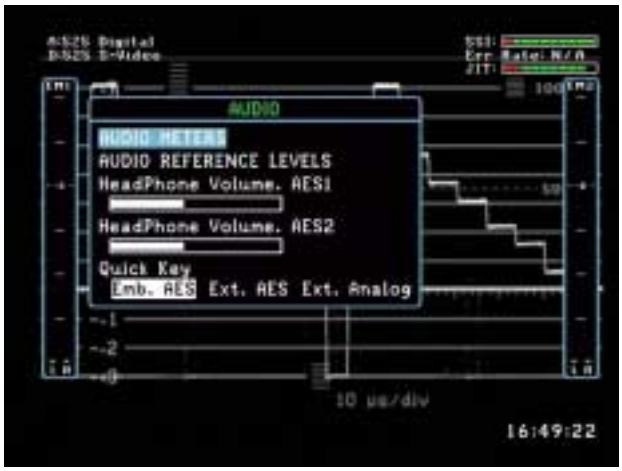

Figure 7-3. Headphone Volume Display

Phase Meters

Audio phase meters can be added to a split screen display (see Figure 7-4). Once added, both the audio meters and phase meters can be turned on or off by pressing the **Blue** (2nd) button and then by pressing the **Clr Mnu** button.

To add phase meters to a split screen display, follow these steps:

1. Press the **Config** button to access the *Configure* menu.
2. Select *DISPLAY* and then press the **Enter** button.
3. Select *AUDIO* and then press the **Enter** button.
4. Select *Phase Meter* and then turn the knob or press the **Enter** button to turn them *ON* or *OFF*.
5. Press the **Clr Mnu** button to exit.

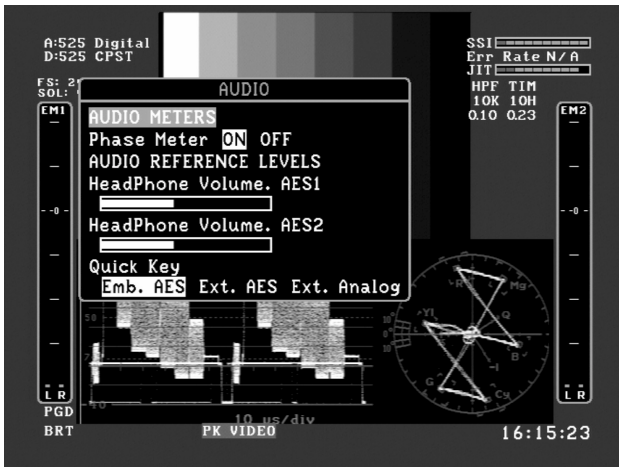

Figure 7-4. Phase Meter Display

Adding Audio Measurements and Limit Reporting

This section explains how to add audio measurements to the automeasure display and set limits for reporting and Picture Guard. You can set audio limits to generate a report, activate an alarm, or activate a Picture Guard indicator if audio levels are above or below the set limits for longer than a preset time. The report can include both audio and video and can be initiated by an audio out of limits indication. Audio is included with video reporting if enabled in the audio limit settings.

To add audio measurement, follow these steps:

1. Select the appropriate audio meter. Refer to "AUDIO METERS" described earlier in this chapter.

   NOTE: For audio automeasure to activate a Picture Guard indicator or activate the Master Alarm, Picture Guard must be turned on.

2. With an A-SDI or B-SDI input signal selected, press the **Msmt** button.

   NOTE: If the D-analog input signal is selected, the D input menus are displayed and used in the same manner.

3. Select *A/B AUDIO MEAS. LIMITS* and then press the **Enter** button.
4. Select *A/B AUDIO* for the system (525 or 625) and then press the **Enter** button.
5. Using the **Arrow** buttons, select *AES1 Level*.
6. Press the **Enter** button to select a setting for the audio limit.
7. Using the knob, set the audio limit.
8. Press the **Enter** button to select *ON*, *OFF*, or *GRD*.
9. Turn the knob to select *GRD* (Picture Guard).
10. Repeat steps 5 through 9 for the *AES2 Level*, *AES1 Duration*, and *AES2 Duration*.

    NOTE: A duration time limit is the amount of time the audio signal can be above or below its set limits before a Picture Guard indicator report or alarm activates.

11. Press the **Clr Mnu** button to exit.

Audio Metering Using the Magni SDM-56X Series

The Magni SDM-56X Series (SDM-560 and SDM-560M) supports three different audio formats: Analog, AES-3 and Embedded Audio (AES-3) in the Serial Digital 601 signal. The purpose of this approach is to have one instrument for Serial Digital studios where different audio formats are being used.

Analog Audio

Audio level is measured in dBm units where 0 dBm is defined as a load of 600 Ω dissipating one milliwatt of power, and where the voltage across the load is 0.775 Vrms.

In the modern analog audio installation, most of the source impedances are low (65-75 Ω) and the output levels are measured in dBu where 0 dBu is defined as a voltage of 0.775 Vrms across an unspecified load impedance.

The noise floor and headroom with an acceptable distortion level bind the audio signal's dynamic range. A level is then chosen between the two ends that provide the best operating range defined as the Standard Operating Level (SOL) or Reference Level (Ref.).

In practice, the Reference Level is usually chosen to be far enough away from the noise floor for good signal-to-noise performance, and also has adequate headroom to handle transient signals with minimal distortion. There are several different operating levels and headroom conditions in common use. In North American video production facilities, the reference level is typically +4 dBu and the clip level is +24 dBu, however, there are a few that still run at +8 dBu and +28 dBu respectively. The latter is a carryover from Ampex machines. Note that in both cases the operating level in digital terms is –20 dBFS so there is 20 dB of headroom above the reference level.

There is an EBU standard that calls for an operating level of +4 dBu and a clip level of +22 dBu. This results in a digitally operating level of –18 dBFS and 18 dB of headroom. This practice is used in the UK, France, and by NHK in Japan. Until recently, the last set of levels in common use is a reference level of 0 dBu and +12 dBu clip level with digital reference at –12 dBFS and 12 dB of headroom. This level set had been used throughout the German speaking part of Europe. Today, the analog audio reference level in Germany is +6 dBu, and the clipping level of +15 dBu with +9 dBu headroom. In the digital environment, this translates to –9 dBFS reference and the clipping level of 0 dBFS.

IEC standard (IEC268-17) describes a standard volume indicator for audio. It sets the Reference Volume at 0 Vu to be +4 dBm (1.228 Vrms), in reference to 0.775 Vrms for 0 dBm or 0 dBu. The IEC standard further defines that the meter must be calibrated in Vu, with a maximum value of +3 Vu and a minimum value of –20 Vu. Many studios still use Vu meters, a specific device with specific meter ballistics. Most modern studios use Peak Program Meters or PPMs. These look like Vu meters, but have very different ballistics that allow for much tighter control of peaks, and hence the opportunity to operate with less headroom.

Digital Audio

In a digital audio system, the dynamic range is defined as the range between a binary signal with all ones (all Fs in Hex) and a signal with all zeros, where the noise floor is dependent on the Analog-to-Digital Converter (A/D). The largest signal, represented by all ones (all Fs in Hex), is defined as 0 dBFS (dB full scale) or Full Scale Digital (FSD). In this system, digital audio is measured in dB relative to FSD. The unit of measure is in dBFS (with the value always being negative) other than 0 dBFS, which represents the maximum level.

In a pure digital environment, the digital audio signal can be transported between different types of equipment without losing its characteristics (digital audio signal can be in 16-, 18-, 20- or 24-bit formats). Since 0 dBFS is the only measurement that cannot change in a digital world, you can look at SOL as either –20 dBFS, –18 dBFS, -12 dBFS or –9 dBFS (depending on the country).

Since an analog audio interface exists in virtually every digital audio facility, either for monitoring or for processing purposes, it is necessary to set an operating standard to accommodate both systems. For digital metering, both the 0 dBFS and the SOL must be specified. On the other hand, if the meter is also measuring analog signals, the Reference Level needs to be adjustable to match the digital system.

Depending on the operating level and headroom defined within a system, an identical digital audio signal in three different systems yields three different meter readings. The output of a 0 dBFS digital audio generator with a –20 dBFS signal might read differently in systems one, two and three as shown in the following table.

Meter Readings for Different Audio Operating Levels

Signal	dBFS Scale	System One	System Two	System Three
FSD	0d BFS	+24 dBu	+28 dBu	+22 dBu
SOL	N/A	+4 dBu	+8 dBu	+4 dBu
Signal 1	-20 dBFS	+4dBu	+8 dBu	+2 dBu
Signal 2	-10 dBFS	+14 dBu	+18 dBu	+12 dBu

As a result, extreme care must be taken when transporting a digital signal between systems. If you put a tape from system three into a system one or system two facility, you will experience a 2 dB higher operating level than is customary in that facility. For example, the analog meter will read +2 dB with respect to 0 Vu. Even though a system two facility has a higher operating level than a system one facility, there is no discrepancy in tape transfers, because both use a digital operating level of -20 dBFS. This does not alter the fact that a +4 dBu tone recorded in system one will play back at +8 dBu in the system two facility. The digital meter will read –20 dBFS and the analog meter will read 0 Vu in either case. A system two facility will pad meters so that 0 Vu equals 8 dBu. Thus, there is no discrepancy between system one and system two. The only transfer discrepancies are with the system three (EBU, +4 dBu/+22 dBu) and German (+6 dBu/+15 dBu, or +0 dBu/+12 dBu) practices.

Audio Monitoring in an Analog and Digital Mixed Environment

To facilitate the conversion between analog and digital audio, it is desirable to define a digital reference level to match the analog reference level. This results in an artificial digital headroom level being established.

In a mixed digital/analog environment, if the digital and analog reference levels and the digital headroom are defined, signals can go from one format to the other without affecting the signal amplitude. However, if there is more than one interface standard, amplitude gain or loss can occur and possibly cause signal clipping or signal-to-noise ratio degradation. There are three commonly used standards for audio metering as listed in the following table, with two widely used around the world.

Analog and Digital Audio Operating Levels

		Digital Audio		
Signal	**Analog Audio**	**System One**	**System Two**	**System Three**
FSD	N/A	+24 dBu	+28 dBu	+22 dBu
SOL	0Vu	+4 dBu	+8 dBu	+4 dBu
Headroom	N/A	20 dB	20 dB	18 dB

System one is widely used in USA and some NTSC countries

System three is widely used in EBU (Europe) and PAL countries

Note that variations in the analog operating level are not a particular concern, so long as the headroom is consistent, and the above situation creates a tape interchange problem for digital tapes because there are three distinct digital operating levels in use. The North America-to-EBU conversion requires a digital gain adjustment of ±2 dB. The Germany-to-North America conversion requires a digital gain adjustment of –11 dB. The North America-to-Germany conversion requires a digital gain adjustment of +11 dB. Note that the last instance is very problematic because North American Programming is not set up to deal with 9 dB of headroom and as a result, program clipping is very likely. Typically a compressor must be employed when using this conversion.

In addition, there are very few standard practices in Pro Audio studios. These types of studios tend to move levels and headroom around to suit the tastes of the particular producer. Often these preferences flow through to the final product. This is particularly noticeable if you load a rock CD and follow it with a classical CD in your car CD player. You will find yourself reaching for the gain control, as the differences in digital operating level often exceed 20 dB.

Measuring Audio Amplitude with the Magni SDM-56X Series

The Magni SDM-56X sets the analog 0 Vu level to be the Standard Operating Level (SOL), and the amount of headroom above the SOL to be equal to the FSD of the digital system. These two numbers then define the audio meters for the SDI embedded audio and the two external inputs (AES-3 and Analog).

To calibrate the audiometers to match your audio system, you need to set the operating level and headroom for your digital and analog audio signals in the pull down menu.

The SOL and FSD of the Audio Reference Levels on Magni's SDM-56X can be set independently for 525 and 625 systems. The adjustable range for the SOL reference level is 0 dBu to +8 dBu, and +12 dBu to +28 dBu for FSD digital full scale. Factory default settings for SOL/FSD are +4 dBu/ +24 dBu for 525 systems and +4 dBu/+22 dBu for 625 systems.

Audio Monitoring with the Magni SDM-56X Series

In the SDM-56X Series, amplitude of up to 4 channels of audio are presented by the bar graph. For SDI embedded audio, one 4-channel audio group can be selected within the audio groups for display. The Magni Bar Graph Audio Meters have a linear dB scale. The total audio range is 60 dB, divided into six 10 dB units. At the 20 dB marked from the top, the "0" mark denotes the 0 Vu level. This level is fixed on the bar graph graticule and corresponds to the setting of the system SOL (0 dBu to +8 dBu). The meter has maximum headroom of 20 dB. There are four audiometers, one for each input channel.

To facilitate visual monitoring, audio amplitudes below the SOL (0Vu) will be green in color, and the portion of signal above the SOL (headroom region) level will be designated as yellow in color. Furthermore, if the audio signal amplitude is +8 dB above the SOL reference, the color of that segment will then turn red. The +8 dB threshold was chosen to indicate the signal is 2.5 times the reference amplitude in volts rms.

Referring to the Analog and Digital Audio Operating Levels table and based on the setting of FSD and SOL, a signal will have different readings on the Magni SDM-56X audiometers. Please note that all readings are referenced to the 0 Vu or SOL reference. Some examples are shown in the following table.

Audio Meter Reading of Various Input Signals with Respect to Operating Level Settings

Signal Source		Audio Reference Level Settings	
		FSD = +24 dBu SOL = +4 dBu	FSD = +22 dBu SOL = +4 dBu
Format	**Amplitude**	**Meter Reading**	**Meter Reading**
Digital	-20 dB	0 Vu	-2 dBu
Digital	-30 dB	-10 dBu	-12 dBu
Digital	-10 dB	+10 dBu	+8 dBu
Analog	+4 dBm	0 Vu	0 Vu
Analog	+12 dBm	+8 dBu	+8 dBu
Analog	–10 dBm	-14 dBu	-14 dBu

For external analog inputs, the meter readings are referenced only to the operating level (SOL), which can be adjusted from 0 dBu to +8 dBu. The Magni SDM-56X has set a fixed analog headroom of +20 dB.

Audio Measurements with the Magni SDM-560M

In the SDM-560M that have measurement screens, the amplitude of all 4 audio channels will also be presented as a numerical readout in dBu in reference to the SOL setting. The minimum readout resolution is 1 dBu.

Audio Phase Monitoring with the Magni SDM-560M

Audio phase monitoring in the analog and digital environment is displayed as a Lissajou pattern, or as an X-Y vector display. To further identify the stereo left and right channels, the Lissajou pattern is rotated by 45°, thus providing a vertical straight-line display when the left and right channels are in phase. The display yields a horizontal line if one of the channels has a phase reversal.

This Lissajou pattern or vector diagram can also indicate the loss of a signal in either a channel or both. During normal operation the vector pattern generally scatters in all quadrants or fills up the square. Note that Magni displays this phase diagram in Split Screen mode only on the SDM-560M.

Audio Decoding with the Magni SDM-56X Series

Embedded audio in the Serial Digital signal is decoded to AES-3 and analog outputs. The analog output is not calibrated and is primarily for monitoring purposes only. The analog output was designed with the reference set for +4 dBu and a fixed headroom of 20 dB. This approach covers approximately 95% of all related applications.

Acknowledgement

We extend our appreciation to Mr. Birney Dayton of ADC, previously President and CEO of NVision Inc., and Mr. Stephen Lyman of Dolby Laboratories for their many valuable inputs.

Notes

8. Automatic Measurement (SDM-560M Only)

Introduction

Automeasurement uses the full power of the SDM-560M Serial Digital/Composite Video Signal Monitor's (SDM-560M) signal processing capabilities. Automeasurement is a flexible system that can take specific kinds of measurements on the most common types of test signals and present these measurements as graphs, as numerical values, and as a red (out of limits) or green (within limits) indications.

Measurements Overview

The following sections provide a summary of the SDM-560M's measurement operation and setup.

Set Selection

Digital inputs A and B have measurement sets that include Component, Composite, and Digital formats. The analog video inputs only have Composite measurements.

Composite sets are selected by way of the *Msmt* menu. After pressing the **Msmt** button, the first item that appears in the *Msmt* menu is the COMPOSITE SETS sub-menu. Turn the menu knob to make the appropriate selection.

Digital sets are enabled by selecting A or B (each have separate limits) and then by pressing the **Display** button until the Digital LED lights.

The Component set is enabled by selecting A or B (each have separate limits) and then by pressing the **Display** button until the CPNT LED lights.

Set Setup

All inputs have both 525/60 and 625/50 set limits. You can set all limits without having to physically change an input of a specific format or video system.

To select inputs A or B:

1. Press the **Msmt** button.
2. Select *MEAS. SET LIMITS* and then press the **Enter** button.
3. Select the appropriate format and then press the **Enter** button.
4. Each measurement set is listed so make sure you set the limits for the correct input format.
5. Select the appropriate *Measure Line*, *Signal Id*, and measure limits.
6. Repeat steps 1 through 6 for the D inputs.

Each measurement has an ON or OFF position in the limits. With a D input, System Video and A/B Digital Set also has a GRD option for enabling Picture Guard.

Some sets have special items that you can set. For example, the Frequency Response set has a custom timing of frequency packets that you can select. The D input System Video also has a Blanking Level setup for horizontal blanking with measurements.

Other Measure Items

The *Audio Limit*, *Response Time*, *Noise Line*, and *REPORT* are available in both A/B or D input menus and can be set in either menu. Note that the settings do not change with the inputs.

Automeasurement Screen Elements

Figure 8-1 shows a typical automeasurement screen. The screen consists of a series of horizontal graphs, each labeled with the name of the measured parameter, such as *SIG STRENGTH*, *JITTER*, *PEAK VIDEO*, or *GAMUT*. The horizontal bars are red at the ends and green in the center with a red or green vertical mark somewhere on the line.

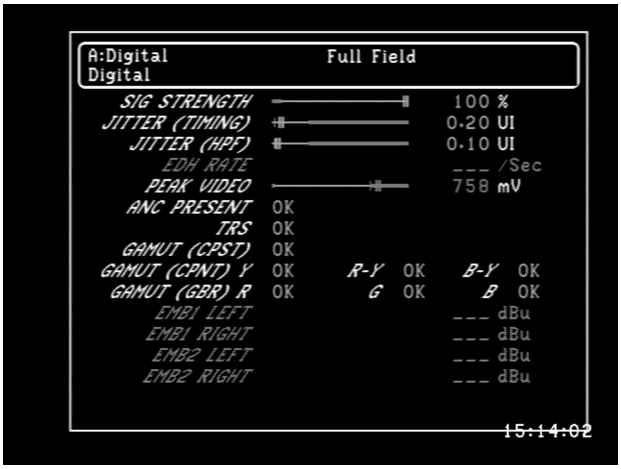

Figure 8-1. Typical Automeasurement Screen

The red ends of the line indicate the out-of-tolerance area. The green, in the middle, indicates the area of measurement that is within the set tolerances. The vertical mark indicates the current reading.

At the right of the screen is the actual measurement with the units. If the current measured value is within tolerance, the vertical mark and the numerical value will be green; otherwise, the vertical mark and numerical value will be red.

A field and line number appears at the top-center of the screen. This line is the source of the measurement that is sampled and analyzed. This line and field can only be set under the menus in *MEAS. SET LIMITS*.

At the top-left of the screen is the selected input. The next line indicates the measurement set that determines what list of parameters will be used. The word (Auto) appears after the set name if that set is selected by the detected test signal on the selected line. Next to the measurement set, in the center, is the name of the test signal. This test signal will either be automatically detected or forced by a menu selection as follows:

- A signal name followed by (Auto) indicates that the SDM-560M has automatically identified the signal type.
- A signal name Any Signal (Auto) indicates that the SDM-560M cannot determine the signal type.
- A signal name without (Auto) indicates that you determined the signal type via menu selections.

The names of the parameters also have special meaning. If the name, such as Peak Video is in italics, the parameter is being measured on all active lines, regardless of the line number that appears at the top of the screen. Names not in italics are measured only on the selected line.

Test Signal Measurement Sets

Four basic composite test signal measurement sets are available with the SDM-560M. Three of the measurement sets are associated with common test signals, such as color bars and multi-burst signals. The fourth measurement set is for live video. The test signal measurement sets can be applied to several test signals, for example, 75% or 100% color bars. You can let the SDM-560M sample a test signal and automatically apply a measurement set, or you can force the SDM-560M to apply a measurement set and then force it to accept one of the test signals. The System Video measurement set is designed to measure live video signals.

The following table lists the types of measurement sets and the test signals normally used.

Measurement Set	**Test Signals**	
Type	525 Systems	625 Systems
System video	Live program video	Live program video
Color measure	75% color bars 100% color bars 75% SMPTE bars	75% color bars 100% color bars
Frequency response	FCC multi-burst Custom mulit-burst	CCIR 18 Custom mulit-burst
Non-linear measure	FCC composite NTC7 composite	CCIR 17/330 National ITS

NOTE: The SDM-560M only supports component and digital measurements from the A/B digital inputs. Press the **Display** button to select CPNT (for component measurements) or Digital (for digital measurements). The CPST position provides composite measurements. CPST is only available if the D input is selected.

Some measurement set parameters (measured parts of the signal) are common to all measurement sets, such as Sync Ampl and Burst Ampl. Other measurement set parameters are specific to one measurement set. For example, APL is a parameter only measured in the System Video set. Each measurement set has a specific line on which it will make the measurements. You select this line. You can also select a different line for each measurement set. The following selections affect the way automeasurement operates in reference to the measurement sets.

- **Automeasurement Set** — This menu selection called *AUTO MEASURE* enables the SDM-560M to sample an incoming signal on the designated line, determine what test signal is available, and then apply the appropriate measurement set, either Color Setup or Frequency Response.

  NOTE: System Video is applied when *AUTO MEASURE* is selected and no test signal is detected on a selected line indicating Any Signal (Auto).

- **Specific Measurement Set** — This selection lets you use a collection of measurement instruments from a specific measurement set but still allows the SDM-560M to automatically determine the test signal. For example, you can select Color Setup even if the signal is multi-burst. You can also use System Video parameters, however, you must specifically select that set.

- **Force a Test Signal** — This selection forces the SDM-560M to apply a specific measurement set to the signal. You might make this selection if the signal is weak or noisy so the SDM-560M can detect the signal.

- **Force Live Video** — This selection is only used with System Video. All System Video parameters can be measured on a live video signal. In the two other measurement sets, forcing Live Video causes the SDM-560M to measure only those parameters that can be measured on a live video signal, such as Burst Ampli and Peak Video. The other parameters are grayed out or turned off.

  The measurement set can be applied to a line in the vertical interval or to an active video line. If you are testing a live video signal that has test signals in the vertical interval, you might want to select a line with a test signal on it or you might want to measure live video in the active part of the picture. If you are testing a full-field test signal, you can select any line in the active area.

Automeasurement Set

The easiest way to take automatic measurements is to use the *AUTO MEASURE* option. Selecting this option enables the SDM-560M to automatically determine what test signal is present on the line you select, and then applies the measurement set that yields the best test results.

To select the *AUTO MEASURE* option:

1. Press the **Msmt** button to access the *A/B MEASUREMENT* or *MEASUREMENT* menu.
2. Select *A/B CPST SELECT SET* or *D SELECT SET* and then press the **Enter** button or turn the knob to step through the measurement sets.
3. Select *AUTO MEASURE* and then use the **Down** arrow to select *MEAS. SET LIMITS*. Press the **Enter** button.
4. Select *COMPOSITE SETS* and then press the **Enter** button.
5. Select *AUTO MEASURE* in NTSC or PAL and then press the **Enter** button.

6. The only selection in this menu is *MEASURE LINE*. Turn the knob to select the line that has a test signal. You can turn through the end of one field and into the next field, or you can switch fields by pressing the **Field Select** button.

7. Press the **Clr Mnu** button to exit.

   NOTE: The selection takes effect when you exit the menu.

Use caution when operating the SDM-560M in *AUTO MEASURE* mode. The SDM-560M recognizes a certain list of test signals. If the test signal is not from this list, the SDM-560M displays the notice Any Signal (Auto) near the top of the automeasurement screen.

In some cases the SDM-560M might recognize a test signal in error. For example, in NTSC, the SDM-560M cannot determine whether 75% color bars has or does not have setup. In this case, the measurement set might give false readings.

As a result, always press the **WFM** button for a quick look at the signal to verify that the SDM-560M has recognized the correct signal. If measuring a test signal in the vertical iterval, press the **Line Select** button and select the same line (as listed on the measure screen) to see the correct waveform. Note that the line select number and the line selected in step 4 are not related.

When using *AUTO MEASURE* mode, the SDM-560M recognizes these signals:

Test Signals	
525 Systems	625 Systems
75% color bars 100% color bars 75% SMPTE bars	75% color bars 100% color bars
FCC multi-burst Custom mulit-burst	CCIR 18 Custom mulit-burst
FCC composite NTC7 composite	CCIR 17/330 National ITS

Note that when selecting a line number for SMPTE Bars and CCIR 17 and 330:

- 75% SMPTE Bars is never a vertical interval signal. It is made up of three separate signals in one frame. If the signal you are measuring is SMPTE Bars, you can select any line in the active video area. The SDM-560M will then recognize it as SMPTE Bars and then look for a setup in the lower part of the field.
- CCIR 17 and CCIR 330 are found on the same line number in opposite fields. The SDM-560M uses CCIR 17 for some of the measurements and CCIR 330 for others. However, if the signal is a full field CCIR 17 or CCIR 330, and you selected a line in the active video area, the other signal will not be in the other field. In this case, some of the sampling produces error measurements, even though the signal is correct.

The limits that are applied when using *AUTO MEASURE* are the same limits that are established in one of the specific measurement sets. For example, set the Sync Ampl limits in the Color Setup measurement set to 38 and 42 IRE, select *AUTO MEASURE* from the *A/B CPST SELECT SET* or *D SELECT SET* menu, and then select line 17. If the signal on line 17 is a color bar, Color Setup is applied, and the limits from the Color Setup measurement set is used.

NOTE: The measurement set that is applied to the signal is the last measurement set selected from the *A/B CPST SELECT SET* or *D SELECT SET* menu. The line number used is also from the applied measurement set.

Forcing a Measurement Set Selection

In some cases you might want to force the SDM-560M to apply a specific measurement set to a test signal. For example, a noisy signal or you want to apply some tests that are available in one measurement set to a different signal.

You can force automeasurement at two levels:

- Force automeasurement to apply a specific measurement set to the signal, but still allow the SDM-560M to determine what test signal is present on the selected line.
- Force the SDM-560M to apply a specific measurement set and force it to recognize the signal. For example, CCIR 18, whether or not the signal is CCIR 18.

To force the SDM-560M to use a specific measurement set:

1. Press the **Msmt** button.
2. Select *A/B CPST SELECT SET* or *D SELECT SET* and then turn the knob to the appropriate measurement set.
3. Select *MEAS. SET LIMITS* and then press the **Enter** button.
4. Select the appropriate measurement format and then press the **Enter** button.
5. Select the appropriate measurement set and then press the **Enter** button.
6. Select *MEASUREMENT LINE* and then turn the knob to specify the line that you want measured. Note that you can turn the knob through the end of one field and into the next, or press the **Field Select** button to change fields. The line number takes effect after exiting the menu.

   NOTE: The line selected in step 4 has no relationship to the line selected for waveforms using the **Field Select** button.
7. Select Signal ID and then turn the knob, or press the **Enter** button several times, to select one of the following:
   - *AUTO ID* lets the SDM-560M determine what signal is on the selected line.
   - A specific test signal forces the SDM-560M to treat the signal as though it were this signal and no other. If the selected signal is one that is normally used in the selected measurement set, all the parameter lines will be active, whether or not they produce meaningful measurements. If the signal is from another set, some parameters will be inactive (gray).
   - *LIVE VIDEO* inactivates most of the parameters in the Color Setup or Frequency Response measurement sets, leaving only those that are applicable to active video. The System Video measurement set is designed to measure Live Video, so all parameters are active.

8. Press the **Clr Mnu** button to exit.

In step 3, you selected a specific measurement set when you pressed the **Enter** button. That is the measurement set that will be applied each time you push the **Auto Meas** button. If you selected a specific test signal (step 5), that is the test signal that will be recognized by the SDM-560M when you use that measurement set.

If you select *AUTO MEASURE* (step 3) instead of a specific measurement set, this overrides any test signal you selected in step 5. For example, if you select *AUTO MEASURE*, and the SDM-560M detects CCIR18 on the selected line, it applies the Frequency Response measurement set and recognizes the signal as CCIR 18, even if the *FREQUENCY RESPONSE* set was set to 75% Color Bars. However, the limits you established for that measurement set are the ones applied to the test signal. *AUTO MEASURE* has no way to change the limits.

Setting Automeasurement Limits

The *AUTO MEASURE* menu lets you set measurement limits over very wide ranges. You can set different limits for the A/B and D inputs, for 525 and 625 signals, and for different component/digital signals on A/B inputs.

After setting the limits for any measurement set, the green (safe) area changes in the bar graph. You can set the limits for each parameter, and anything else you set is saved for that measurement set on that input for that system (525 or 625).

There are separate limits for the Analog (D) and Digital (A/B) inputs, separate limits for 525 and 625 systems (even for the same input), and separate limits for each of the measurement sets as listed in the following table.

List of Different Measurement Sets
(There is a different set of limits for each of these combinations)

525 Signals		625 Signals	
A/B Inputs	D Inputs	A/B Inputs	D Inputs
COMPOSITE SETS			
System video	System video	System video	System video
Color setup	Color setup	Colour setup	Colour setup
Frequency response	Frequency response	Frequency response	Frequency response
Non-linear	Non-linear	Non-linear	Non-linear
COMPONENT SETS			
SMPTE		EBU	
DIGITAL CH A SET		DIGITAL CH A SET	
DIGITAL CH B SET		DIGITAL CH B SET	

You can set the limits when you are viewing the automeasure screen or when any other display is active. To set the limits for any measurement set:

1. Select the A/B or D signal input.
2. Press the **Mesmnt** button.
3. Select *A/B CPST SELECT SET* or *D SELECT SET* and then press the **Enter** button.

4. Select the appropriate measurement set and then press the **Enter** button.
5. Select *MEASURE LINE* and then turn the knob to select the line where the test signal will be found. Press the **Field Select** button if you need to switch fields.
6. Push the **Down Arrow** button twice to highight *LIMITS*, which has the name of the measurement set and the input letter.
7. Press the **Enter** button.

   Four columns now appear on the display. On the left is the *MEASUREMENT* parameter. The other three columns show the minimum and maximum limits and the nominal values. Note that some parameters have a maximum only.
8. Using the **Arrow** buttons, move the cursor up and down to highlight the desired parameter.
9. Press the **Enter** button to move the cursor to the *MIN* column and then turn the knob to set the minimum acceptable value.
10. Press the **Enter** button to move the cursor to the *MAX* column and then turn the knob to set the maximum acceptable value.

    While in the *MIN* and *MAX* columns, the **Arrow** buttons switch the cursor back and forth between them. Pressing the **Enter** button moves the cursor from *MIN* to *MAX*, or from *MAX* out and down to the next parameter name (step 8). Pressing the **Prev Mnu** button moves the cursor to the parameter in the current row.
11. After setting all acceptable values, press the **Clr Mnu** button to exit or press the **Prev Mnu** button twice to go back and select another measurement set.

    NOTE: Composite and S-video limits are the same. Whatever limits are set for Input A composite using a 625 signal in the Color Setup limits will also be used when Input A detects an S-video 625 signal and the Color Setup measurement set is used.

Special Considerations for Multi-Burst

The SDM-560M only recognizes two standard multi-burst signals: FCC multi-burst in NTSC and CCIR 18 in PAL. If you want to auto measure one of these multi-burst signals, you need to set the SDM-560M up to detect either a custom multi-burst or a standard multi-burst signal. The following table lists all the applicable combinations.

Automeasurement Setup			Applied Signal		
Controlling Measurement Set	**Multi-Burst ID Setting**	**Frequency Response Signal ID Setting**	**FCC Multi-Burst**	**CCIR 18**	**Multi-Burst of Another Type**
AUTO MEASURE	Standard	Any setting	FCC multi-burst	CCIR 18	CCIR 18 or FCC multi-burst
AUTO MEASURE	Custom	Any setting	Custom	Custom	Custom
Frequency response	Standard	*AUTO ID*	FCC multi-burst	CCIR 18	CCIR 18 or FCC multi-burst
Frequency response	Custom	*AUTO ID*	Custom	Custom	Custom
Frequency response	Any setting	CCIR 18 or FCC multi-burst	FCC multi-burst	CCIR 18	CCIR 18 or FCC multi-burst
Frequency response	Any setting	Multi-burst	Custom	Custom	Custom

At the bottom of the *Frequency Response* menu is an item called Multiburst ID. This is the key to multi-burst signal detection when using *AUTO MEASURE*. Two selections under Multiburst Id are available:

- **STANDARD** (FCC multi-burst or CCIR 18) — If the SDM-560M detects a multi-burst signal of any kind, it assumes it is one of these two standards, depending on the line rate of the signal.
- **CUSTOM** — This is a non-standard, custom multi-burst that you define as described in the section “Setting Timing for Multi-Burst.” If the SDM-560M detects a multi-burst of any kind, it assumes it is a custom multi-burst, and will take measurements according to the timing and frequency established under the Frequency Response menus *MULTIBUTST TIMING* and *PACKET FREQUENCIES*.

Setting Timing for Multi-Burst

This section explains how to set variables for a custom multi-burst signal. To set the variables, use the following two-step process:

> **NOTE:** Prior to setting variables, the SDM-560M must be able to determine the starting time (from the leading edge of sync) of the bar, the pedestal, each frequency burst or packet, and the frequency of each packet.

The first step is to find out the timing of each signal part:

1. Look at the multi-burst signal as a waveform. Use the **1H** sweep rate. Note that the major graticle divisions represent 5 µs increments.
2. Use the **H POS** knob to move this wide, two-line display so the center sync pulse is near the left side of the screen. You should now see one line all the way across the screen with a sync pulse at the left.
3. Move the waveform up and left-right so the midpoint of the leading edge of sync is exactly on one of the major graticule marks.
4. Using only the **V POS** knob, move the waveform up and down and then write down the timing measurements for each of the following:
   - Beginning of the white bar
   - Beginning of the pedestal after the white bar
   - Beginning of each of the frequency packets

Once you have all the figures, continue with the second step of the proccess:

1. Select the appropriate signal input (A/B or D).
2. Press the **Msmt** button.
3. Select *MEAS. SET LIMITS* and then press the **Enter** button.
4. Select *COMPOSITE SETS* and then press the **Enter** button.
5. Select *FREQUENCY RESPONSE* in 525 or 625 and then press the **Enter** button.
6. Select *MULTIBURST TIMINGS* and then press the **Enter** button.
7. Select Bar and then turn the knob to set the timing to 1 µs more than the value you measured on the multi-burst signal.
8. Continue with Pedestal and each Packet, setting the time to 1 µs more than the value you mesasured on the signal.
9. Press the **Prev Mnu** button.
10. Select *PACKET FREQUENCIES* and then press the **Enter** button.

11. Select each of the packets and then turn the knob to set the frequency, in 0.1 MHz increments, to the frequency of that packet in the multi-burst. Note that the frequencies shown in the automeasurement display does not change to reflect your entry here. However, the measurement system must have the correct frequency to operate properly.

12. Press the **Clr Mnu** button to exit.

Now when the SDM-560M selects *MULTIBURST TIMINGS* instead of FCC multi-burst or CCIR 18, it uses these timing measurements to analyze the signal. These values remain as they are until you change them, or until you do a full system reset.

> **NOTE:** The multi-burst timing and packet frequency can be set differently for inputs A/B or D inputs in 525 and 625 line systems. As a result, there are four sets of multi-burst timing and packet frequency that the SDM-560M can recognize.

Automeasurement with Live (Program) Video

The System Video measurement set is designed for measuring program (live video) signals. The Color Setup and Fequency Response measurement sets can also be used on live video, but they have limited results.

The System Video measurement set is the one most used on live or program video.You must specifically select this measurement set, it cannot be selected automatically using *AUTO MEASURE*. Measuring program video is different from other measurement test signals. Some of the measurements are made on all active lines instead of on a specifically selected line. These include:

- **Peak Video** — The highest point reached by any video, including chrominance, on any active line.
- **Peak Luma** — The highest point reached by the liminance video on any active line. Luminance video is the video that would result from passing in through the luma filter.
- **APL** — Average Picture Level. The average of the active picture area, including chroma. This measurement is taken in blocks of 10 lines, sequenced through the picture, so it will vary as the measurements are taken in differenct parts of the picture.
- **H Blanking Level** — Horizontal blanking is measured at the H Blanking Level. It is the distance (time) between the last video at that level on any active line to the first video at that level on any active line. The H Blanking Level is set in the *COMPOSITE SETS, SYSTEM VIDEO* menu.

Measurement Parameters Used with Live Video				
Parameters	System Video	Color Setup	Frequency Response	Non-Linear
Sync Ampl	X	X	X	X
Burst Ampl	X	X	X	X
Peak Video(1)	X			X
Peak Luma(1)	X			X
APL(1)	X			
Noise(1)	X			X
Horiz. Blanking	X			
Horiz. Ref. Timing	X			
Burst Ref. Phase	X			
SC/H Phase	X			
Color Frame	X			
Bar Ampl		X	X	

(1) Applicable to Digital Video Input

Digital Measurement Screen
SIG STRENGTH
JITTER (TIMING)
JITTER (HPF)
TRS
EDH ERROR
ANC PRESENT
PEAK VIDEO
PICTURE FREEZE
GAMUT (CPST)
GAMUT (CPNT)
GAMUT (RGB)
AUDIO 1 (5, 9, or 13)
AUDIO 1 (6, 10, or 14)
AUDIO 1 (7, 11, or 15)
AUDIO 1 (8, 12, or 16)

The other measurements (not in italic) are made on the line shown at the top of the measurement screen (see Figure 8-2). The one exception is Noise. This parameter is measured on its own special line.

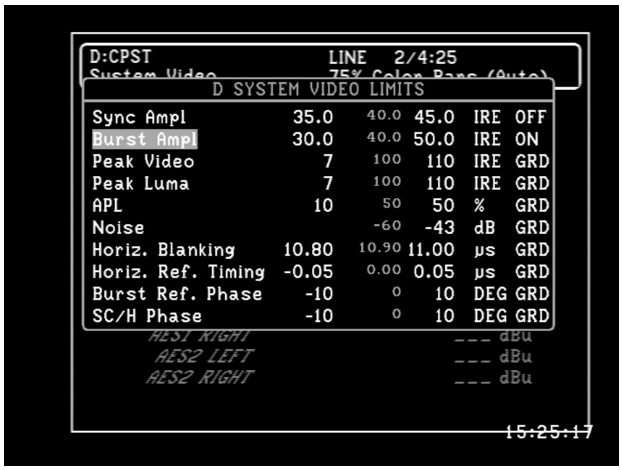
D:CPST
LINE 2/4:25
D SYSTEM VIDEO LIMITS
Sync Ampl 35.0 40.0 45.0 IRE OFF
Burst Ampl 30.0 40.0 50.0 IRE ON
Peak Video 7 100 110 IRE GRD
Peak Luma 7 100 110 IRE GRD
APL 10 50 50 % GRD
Noise -60 -43 dB GRD
Horiz. Blanking 10.80 10.90 11.00 µs GRD
Horiz. Ref. Timing -0.05 0.00 0.05 µs GRD
Burst Ref. Phase -10 0 10 DEG GRD
SC/H Phase -10 0 10 DEG GRD
AES1 RIGHT ___ dBu
AES2 LEFT ___ dBu
AES2 RIGHT ___ dBu
15:25:17

Figure 8-2. System Video Measurement Set with Live Video

To select the Noise measurement line:

1. Press the **Msmt** button.
2. Select *Noise* and then turn the knob to select a line between 10 and 15.
3. Press the **Clr Mnu** button.

The other measurement sets (Color Setup and Frequency Response) can also sample live video when forced to do so. Each time you use either of these measurement sets, only three of the parameters remain active: Sync Ampl, Burst Ampl, and Bar or White Bar Ampl. To force either of these measurement sets to sample live video:

1. Press the **Msmt** button.
2. Select *MEAS. SET LIMITS* and then press the **Enter** button.
3. Select the appropriate signal format and then press the **Enter** button.
4. Select the appropriate measurement set and then press the **Enter** button.

   NOTE: *AUTO MEASURE* cannot be applied to live video. *AUTO MEASURE* will also select either the Color Setup or the Frequency Response measurement set.
5. Select Signal ID and then turn the knob until the words *LIVE VIDEO* appear on the display.
6. Press the **Clr Mnu** to exit.

   NOTE: System Video is the measurement set used by Picture Guard and each item is enabled in the limits by selecting ON, OFF, or GRD (Picture Guard).

Automatically Reporting Measurements

The reporting feature sends measurement data to a PC file or to a printer at scheduled intervals. You can run reporting all day or for just part of the day. Errors can be reported as they occur and as all errors are cleared. This sections explains how to configure the SDM-560M to generate a report. The sections that follow explain how to configure a PC or printer to accept reports, and how to schedule a report.

A report is a printout, either on paper or in an ASCII computer file, of the current measurements. A report can be generated by any of the following events:

- It is time for a scheduled report
- A new error occurs
- A previously reported error is still an error after a period of time
- All errors have been cleared
- The video signal is lost (no sync)
- The video signal returns

Reports can be sent to a PC to be displayed on its monitor screen and saved as an ASCII text file. In this configuration, the SDM-560M RS-232 computer interface is connected to one of the serial ports using a 9-pin cable. Reports can also go directly to a serial printer, and a page of the measurement is printed each time there is a full page of data. This configuration uses the SDM-560M RS-232 modem interface and a 9-pin serial cable.

To set up the SDM-560M and a PC for sending reports to an ASCII text file:

1. Connect a 9-pin serial cable between the SDM-560M RS-232 computer interface and a PC.
2. Press the **Config** button.
3. Select *SERIAL PORTS* and then press the **Enter** button.

4. Select Computer Port and then turn the knob or press the **Enter** button until you see *REPORT*.
5. Select *COMPUTER/REPORT PORT SETUP* and then press the **Enter** button.
6. Select Baud Rate and then turn the knob to select the baud rate used by the computer's communications program.
7. Select Handshaking and then turn the knob or press the **Enter** button to select XON/XOFF.
8. Press the **Clr Mnu** button to exit.

To set up the SDM-560M and a printer for sending reports to a printer:

1. Connect a 9-pin serial cable between the SDM-560M RS-232 modem interface and a printer.
2. Press the **Config** button.
3. Select *SERIAL PORTS* and then press the **Enter** button.
4. Select Modem Port and then turn the knob or press the **Enter** button until you see *REPORT*.
5. Select *MODEM/REPORT PORT SETUP* and then press the **Enter** button.
6. Select Printer Type and then turn the knob or press the **Enter** button until your printer type appears.
7. Select Baud Rate and then turn the knob to select the baud rate used by the printer.
8. Select Handshaking and then turn the knob or press the **Enter** button to select XON/XOFF.
9. Press the **Clr Mnu** button to exit.

Sending Reports to a PC

To send measurement reports from the SDM-560M to a PC:

1. Follow the procedures previously described in "Automatically Reporting Measurements."
2. Press the **Msmt** button.
3. Select *REPORT* and then press the **Enter** button.
4. Select Error Reporting and then press the **Enter** button to select ON.
5. Select Report Sustained Errors and then turn the knob until it shows 1 Minute.
6. Press the **Prev Mnu** button.
7. Select *CPST SET SELECT* and then turn the knob to *System Video*.
8. Select *MEAS. SETS LIMITS* and then press the **Enter** button.
9. Select *COMPOSITE SETS* and then press the **Enter** button.
10. Select *SYSTEM VIDEO* in the correct input format and then press the **Enter** button.
11. Select *A/B SYSTEM VIDEO LIMITS* or *D SYSTEM VIDEO LIMITS* and then press the **Enter** button.

12. Select Sync Ampl and then press the **Enter** button to place the cursor in the MIN column.
13. Turn the knob clockwise until the reading is well above 40 IRE (300 mV). Press the **Clr Mnu** button, and then press the **Mesmnt** button to display the automeasure screen. An error should appear in the Sync Ampl line.

In approximately 20 seconds you should see on your PC screen a series of measurements with the title "New Error." Every minute after this you should see a new list of measurements with the title "Sustained Error." If, after 2 minutes, you do not see anything on the PC screen, something is set up wrong between the SDM-560M and the PC. Check the cabling and all the settings in the SDM-560M menus and the PC's communications program.

Sending Reports to a Printer

To send measurement reports from the SDM-560M to a printer:

1. Follow the procedures previously described in "Automatically Reporting Measurements."
2. Press the **Msmt** button.
3. Select *REPORT* and then press the **Enter** button.
4. Select Error Reporting and then press the **Enter** button to select ON.
5. Select Report Sustained Errors and then turn the knob until it shows 1 Minute.
6. Press the **Prev Mnu** button.
7. Select *MEAS. SETS LIMITS* and then press the **Enter** button.
8. Select *COMPOSITE SETS* and then press the **Enter** button.
9. Select *SYSTEM VIDEO* in the correct input format and then press the **Enter** button.
10. Select *A/B SYSTEM VIDEO LIMITS* or *D SYSTEM VIDEO LIMITS* and then press the **Enter** button.
11. Select Sync Ampl and then press the **Enter** button to place the cursor in the MIN column.
12. Turn the knob clockwise until the reading is well above 40 IRE (300 mV). Press the **Clr Mnu** button, and then press the **Mesmnt** button to display the automeasure screen. An error should appear in the Sync Ampl line.

In approximately 20 seconds you should see a light flashing on your printer signaling you that data is being sent from the SDM-560M. You should start to see printed a series of measurements with the title "New Error." Every minute after this you should see printed a new list of measurements with the title "Sustained Error." If, after 5 minutes, you do not see anything from the printer, something is set up wrong between the SDM-560M and the printer. Check the cabling and all the settings in the SDM-560M menus and the printer menus.

Scheduling Reports

There are several options available to you when scheduling a report. The reporting process can operate all the time or during a specified period of the day. Reporting can be at regular intervals, or when there is an error, or both. Continuing errors can be reported at specified intervals. Afterwards, you can get a special report after all errors have been cleared.

To schedule a report:

1. Press the **Msmt** button.
2. Select *REPORT* and then press the **Enter** button.
3. The following *REPORT* menu appears on the display:
   - *START/STOP TIME SETUP*
   - *START REPORT TIME*
   - *STOP REPORT TIME*
   - Scheduled Report Interval
   - Error Reporting
   - Report Sustained Errors
   - Report All Errors Clear

START/STOP TIME SETUP

The sub-menu found under this selection lets you turn reporting on for a specific part of the day. If Start/Stop Function is off, the rest of this sub-menu has no effect. If Start/Stop Function is on, set the start and stop time for reporting by highlighting the two lower slections and then by turning the knob for hours and minutes. When Start/Stop Function is on, the remainder of the *REPORT* menu is active only between the start and stop times. When Start/Stop Function is off, all remaining selections in the *REPORT* menu work all the time.

START REPORT TIME

Lets you set a *START REPORT TIME* in hours and minutes.

STOP REPORT TIME

Lets you set a *STOP REPORT TIME* in hours and minutes.

Scheduled Report Interval

Select this item and then turn the knob to set this selection for any time between 5 minutes and 480 minutes (8 hours). Reporting occurs at these intervals, starting immediately. The report ocurs whether there is an error or not. If you set this item to 0 (OFF) (just below the 5 minute point), periodic reporting does not occur at all, and you will only see error reporting (if error reporting is enabled).

Error Reporting

If selected, every time a new error occurs, another report is generated. This is in additon to any other scheduled reports. When a new error occurs, the SDM-560M waits approximately 10 seconds before sending a set of measurement data to a PC or printer. This prevents several, nearly simultaneous errors from generating several printouts. However, the time of each error is noted next to it in the data set. Note that each time a front panel control is moved or changed, the SDM-560M waits 20 seconds before taking any measurements.

Report Sustained Errors

When an error occurs, the SDM-560M normally generates a report. To keep generating reports while the error is still there, set this option anywhere from 1 to 60 minutes. If this selection is set to 3 minutes, a new report is generated every 3 minutes, as long as the error keeps occuring. If this selection is set to 0 (OFF), errors will be reported only when they first occur.

NOTE: This function initiates a report after a set interval if Error Reporting is disabled.

Report All Errors Clear

If this selection is enabled, a special report is generated when all errors are cleared. All measurements are given in this report. Note that if there are three errors and one of them clears, this condition is not given in the special report.

NOTE: This function operates only if Error Reporting is enabled.

About Reporting

1. If the video signal is lost, a loss of video signal report is immediately generated and no measurements are given. When video is restored, a reacquired video signal report is generated along with the appropriate measurements.
2. Out of tolerance conditions are registered immediately, but they are not reported to the printer or PC for a few seconds. This allows the SDM-560M to make sure that all errors are reported. If the SDM-560M does not wait, and 5 errors occurred within milliseconds of each other, a complete report is generated for each of these errors, listing all the measurements each time.
3. If any control on the front panel is changed, the SDM-560M waits 20 seconds before registering an error.
4. Errors in a report are marked with an asterisk (*) and with the time they first occurred. Sustained errors continue to carry this first occurance time in later reports. The time and date at the top of the report shows when this particular report was generated.

Special Considerations for Alarm Outputs

An alarm output can be set to activate with a preset delay when there is an error in a measurement set. Both closed captioning and audio missing can also be set to activate the alarm output.

Alarm Output

Pin one on the DC CONTROL/ALARM connector is dedicated to an alarm. When any automeasuremetn screen or Picture Guard shows an out-of-tolerance condition, this pin goes to ground (earth) if *ALARM* is enabled and after a delay set in *ALARM DELAY*.

To configure an alarm:

1. Press the **Config** button.
2. Select *ALARM SETTINGS* and then press the **Enter** button.
3. Select *Master Alarm* and then press the **Enter** button to turn it on.
4. Select *Master Alarm Delay* and then turn the knob to set a delay of 0 (OFF) or to a delay setting in minutes.
5. Press the **Clr Mnu** button to exit.

The alarm output can be set to zero to give an immediate indication of an error for an alarm. The output can also be set to a delay to initiate other actions after an error has continued for longer than the delay setting. This action could be to switch to a backup path for routing or a backup video source.

Closed Caption Alarm

The SDM-560M can be set to cause an alarm output if the closed caption signal is missing for a preset time period.

To configure a *CC ALARM*:

1. Press the **Config** button.
2. Select *ALARM SETTINGS* and then press the **Enter** button.
3. Select *CC ALARM* and then turn the knob to set a delay of 0 (OFF) or to a delay setting to enable the alarm.
4. Press the **Clr Mnu** to exit.

Audio Alarm

Audio limits can be set to generate reports or to activate an alarm if audio levels are above or below set limits for longer than a set time. Refer to the section on “Audio Limit Reporting,” in Chapter 7, for more information.

Notes

9. Measurement Screens (Parameters and Limits)

Introduction

This chapter lists details about the SDM-560M Serial Digital/Composite Video Signal Monitor's (SDM-560M) automeasurement screens. Three tables are included:

- Where Parameters are Measured — lists each parameter, shows which measurement set(s) a parameter is found in, and whether a parameter is measured in NTSC, PAL, or both.
- Definitions of Automeasurement Parameters — lists all the parameters, giving their definitions and the units in which each is measured.
- Parameters: Range, Accuracy, and Limits — lists all the parameters with the range of measurement possible, the accuracy (absolute and relative), and the minimum and maximum limit settings.

Where Parameters are Measured (Composite)

Measured Parameter	System Video	Color Setup	Non-Linear	Frequency Response
0.5 MHz reference				NTSC
1.0 MHz				PAL
1.25 MHz				NTSC
2.0 MHz				Both
3.0 MHz				NTSC
3.58 MHz				NTSC
4.0 MHz				PAL
4.1 MHz				NTSC
4.8 MHz				PAL
5.8 MHz				PAL
APL(1)	Both			
Bar ampl				NTSC
Black bar ampl				PAL
Blue ampl		Both		
Blue phase		Both		
Burst ampl(1)	Both	Both	Both	Both
Burst ref phase(1)	Both			
Chr/lum gain			Both	
Chr/lum dly			Both	
Chroma reference			Both	
Color frame(1)	Both			
Dif gain			Both	
Diff phase			Both	

continued

Measured Parameter	System Video	Color Setup	Non-Linear	Frequency Response
Green ampl		Both		
Green phase		Both		
H blanking(1)	Both			
H reference timing(1)	Both			
K-2T factor			Both	
Lum linearity			PAL	
Noise(1)	Both			
P/B ratio			Both	
Peak luma(1)	Both	Both	Both	
Peak video(1)	Both			
Pedestal ampl				Both
Red ampl		Both		
Red phase		Both		
Reference ampl				PAL
SC/H phase(1)	Both			
Setup	NTSC			
Sync ampl(1)	Both	Both	Both	Both
Weighted noise(1)			Both	
White bar ampl		Both		PAL
White bar				
Yellow ampl		Both		
Yellow phase		Both		

(1) Available with Picture Guard on D inputs

Digital Measurements – A/B Inputs (Available with Picture Guard)

Measured Parameter	Definition
Signal strength	Serial digital input amplitude.
Jitter (timing)	10 Hz filtered input jitter.
Jitter (HPF)	100 Hz filtered input jitter.
EDH error	EDH error rate per 30 fields.
Peak video	Same as analog measurement on video signal in the digital stream.
ANC. Percent	Ancillary signals present.
TRS	Timing reference signal errors.
Gamut (CPST)	Out of limits on peak composite encoded video.
Gamut (CPNT)	Out of limits on component encoded video.
Gamut (RGB)	Out of limits on RGB encoded video.

EBU/SMPTE Component Measurements (A/B Inputs)

Measured Parameter	Definition
Y ampl	Y (luminance) amplitude.
B-Y ampl	B-Y color difference signal amplitude.
R-Y ampl	R-Y color difference signal amplitude.
Sync ampl	Sync amplitude (as encoded back onto signal).
Peak video	Peak of the luminance signal.
H timing Ref	Timing of input signal relative to Ext Ref.
B-Y to Y	Timing of B-Y relative to Y component.
R-Y to Y	Timing of R-Y relative to Y component.

Audio

Switchable between:

1. Embedded
2. External AES
3. External Analog

Measured Parameter	Definition
1 left(1)	Upper and lower limits with alarm delays for each.
1 right(1)	Upper and lower limits with alarm delays for each.
2 left(1)	Upper and lower limits with alarm delays for each.
2 right(1)	Upper and lower limits with alarm delays for each.

(1) The same for both

Definitions of Automeasurement Parameters

Measured Parameter	Definition
0.5 MHz ref	Peak-to-peak amplitude of the 0.5 MHz packet, in IRE or mV.
1.25 through 5.8 MHz	Differences between the peak-to-peak amplitude of the frequency packet and the 0.5 MHz packet, in percent.
APL	Average of active video, aquired in blocks of 10 lines sequenced through the field, in percent.
Bar ampl	Level of the white bar in a multi-burst or non-linear signal, in IRE or mV.
Blue ampl	Peak-to-peak amplitude of the blue bar, in IRE or mV.
Burst ampl	Phase angle of the blue bar relative to zero degrees, in degrees.
Burst ref phase	Burst phase of an external reference-to-burst phase of the input signal, in degrees.
Chr/lum dly	Difference in timing between the luma and chroma parts of the modulated pulse, in ns.
Chr/lum gain	Difference in amplitude between the luma and chroma parts of the modulated pulse, in percent.
Chroma ref	Peak-to-peak amplitude of the chroma signal at the blanking level just prior to the five-step signal, in IRE or mV.
Color frame	Comparasion of the SC/H of line 51 of the selected signal to the SC/H of the external reference on line 201, extrapolated back to the selected line, in OK or ERR.
Diff gain	Each box represents on of the five steps in the signal. Each box shows the phase difference between the chroma reference and that step. Any step exceeding 2% shows a + or – in the box. Any step exceeding the limit value turns red. The readout value is the peak-to-peak error (turns red if the limit is exceeded).
Diff phase	Each box represents on of the five steps in the signal. Each box shows the phase difference between the chroma reference and that step. Any step exceeding 2 degrees shows a + or – in the box. Any step exceeding the limit value turns red. The readout value is the peak-to-peak error (turns red if the limit is exceeded).
Green ampl	Peak-to-peak amplitude of the green bar, in IRE or mV.
Green phase	Phase angle of the green bar relative to zero degrees, in degrees.
H blanking	The distance (in time) between the last video found at the *H BLANKING LEVEL* on any active line to the first video found at this level on any active line.
H ref timing	The time between the sync edge of the selected signal and the external reference sync edge, in µs.

continued

Measured Parameter	Definition
K-2 T factor	The %K factor if the mathematical representation of the pulse shape that best fits the K factor template equation.
Lum linearity	Boxes show the amplitude difference between the average of all steps and each step. Any step exceeding 2% shows a + or -. Any step exceeding the limit value turns red. The readout value is the peak-to-peak error (turns red if the limit is exceeded.
P/B ratio	Ratio of the pulse peak to the center of the bar, in percent.
Noise	CCIR unified weighted noise level on a separately selected line.
Peak luma	Amplitude of the highest luminance level, as though a signal were passed through the luma filter, during the active part of the video picture, in IRE or mV.
Peak video	Amplitude of the highest video level, including any chroma, during the active part of the video picture, in IRE or mV.
Pedestal ampl	Pedestal amplitude of the multi-burst signal, in IRE or mV.
Red ampl	Peak-to-peak amplitude of the red bar, in IRE or mV.
Red phase	Phase angle of the red bar relative to zero degrees, in degrees.
Reference ampl	Pedestal amplitude of a multi-burst signal scaled to reflect the level of the multi-burst packets, in IRE or mV.
SC/H phase	Phase relationship between the 50% point of the leading edge of sync compared to the color burst from the selected line, in degrees.
Setup	Difference in the level between the last setup of the color bar or blanking, or, in SMPTE bars, between setup of the IWQ part of the signal and blanking, in IRE.
Sync ampl	Difference between blanking and the sync tip, in IRE or mV.
VITC	Decode of the Vertical Internal Time Code (VITC) on the VITC selected line, in hours, minutes, and seconds.
White bar ampl	Difference in the level between the white bar and blanking, in IRE or mV.
Yellow ampl	Peak-to-peak amplitude of the yellow bar, in IRE or mV.
Yellow phase	Phase angle of the yellow bar relative to zero degrees, in degrees.

Parameters: Range, Accuracy, and Limits

Parameter	Range	Absolute Accuracy	Relative Accuracy	Notes	Min Setting	Max Setting	Default Min	Default Max
0.5 MHz reference	40 to 120 IRE	± 1 IRE	± 1 IRE	60 IRE nominal	0.5 IRE	100.1 IRE	0.5 IRE	100 IRE
0.5 through 5.8 MHz	280 to 840 mV	± 2%	± 2%	420 mV nominal	-50%	50%	-10%	10%
APL(1)	0 to 125%	± 3%	± 2%		-19%	129%	10%	100%
Bar ampl	50 to 138 IRE **350 to 980 mV**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	100 IRE nominal **700 mV nominal**	-49.5%	49.5%	-10%	10%
Black bar ampl	**0 to 280 mV**	**± 7 mV**	**± 3 mV**	**140 mV nominal**	**1 mV**	**279 mV**	**100 mV**	180 mV
Blue ampl	Nominal ± 50% **Nominal ± 50%**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	62.2 IRE nominal **470 mV nominal**	27.0 IRE **349 mV**	109 IRE **724 mV**	52 IRE **398 mV**	72 IRE **675 mV**
Blue phase	Nominal ± 90°	± 1°	± 1/2°	347.1° nominal	337.6°	356.6°	342.1°	352.1°
Burst ampl(1)	20 to 80 IRE **150 to 600 mV**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	40 IRE nominal **300 mV nominal**	20.5 IRE **151 mV**	58.5 IRE **449 mV**	30 IRE **225 mV**	50 IRE **375 mV**
Burst ref phase(1)	± 90°	± 2°	± 1°	Ext ref to input	-24°	24°	-10°	10°
Chr/lum dly	± 500 ns	± 5 ns	± 5 ns	Modulated pulse	-499 ns	499 ns	-50 ns	50 ns
Chr/lum gain	± 40%	± 2°	± ½%	Modulated pulse	-49.5 IRE	49.5 IRE	-10%	10%
Chroma reference	20 to 80 IRE **70 to 560 mV**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	40 IRE nominal **280 mV nominal**	20.5 IRE **151 mV**	59.5 IRE **449 mV**	30 IRE **225 mV**	50 IRE **375 mV**
Color frame(1)	± 30 µs			Result: OK/ERR				
Diff gain	± 20% **± 20%**	± 2% **± 2%**	± 1% ± 1%	40 IRE chroma **280 mV chroma**	-49.5%	-49.5%	-20%	20%
Diff phase	± 20° **± 20°**	± 2° **± 2°**	± 1/2° **± 1/2°**	40 IRE chroma **280 mV chroma**	-59.5°	-59.5°	-20°	20°
Green ampl	Nominal ± 50% **Nominal ± 50%**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	82.4 IRE nominal **620 mV nominal**	40 IRE **492 mV**	136 IRE **925 mV**	72 IRE **541 mV**	92 IRE **874 mV**
Green phase	Nominal ± 90°	± 1°	± 1/2°	240.8° nominal	231.3°	250.3°	235.8°	245.8°
H blanking(1)		± 50 ns **± 50 ns**	± 25 ns **± 25 ns**	Measures minimum interval	9.01 µs **11.01 µs**	11.99 µs **13.99 µs**	10.80 µs **12.80 µs**	11.00 µs **13.00 µs**
K-2 T factor	0 to 10%	± 1%	± 1/2%	2T pulse	0.3%Kf	9.8%Kf		2%Kf
Lum linearity	**0 to 50%**	**± 2%**	**± 1%**	**PAL std only**	**-49.5%**	**49.5%**	**± 20%**	**-20%**
P/B ratio	± 40%	± 1%	± 1/2%		-60.5%	139.5%	80%	120%
Reference timing	60 µs	± 10 ns	± 10 ns	Relative to external input	-2.00 µs	2.00 µs	-0.05 µs	0.05 µs
Noise(1)	40 to 70 dB	± 2 dB	± 2 dB	Weighted noise	-80 dB	-31 dB		-43 dB
Peak luma(1)	0 to 138 IRE **350 to 980 mV**	± 2 IRE **± 14 mV**	± 2 IRE **± 14 mV**	Active video **Active video**	1 IRE **5 mV**	134 IRE **950 mV**	7 IRE **10 mV**	110 IRE **735 mV**
Peak video(1)	0 to 138 IRE **350 to 980 mV**	± 2 IRE **± 14 mV**	± 2 IRE **± 14 mV**	Active video **Active video**	1 IRE **5 mV**	134 IRE **950 mV**	7 IRE **10 mV**	110 IRE **735 mV**
Pedestal ampl	20 to 70 IRE	± 1 IRE	± 1/2 IRE	40 IRE nominal	20.5 IRE	59.5 IRE	20.5 IRE	59.5 IRE

continued

Parameter	Range	Absolute Accuracy	Relative Accuracy	Notes	Min Setting	Max Setting	Default Min	Default Max
Red ampl	Nominal ± 50% **Nominal ± 50%**	± 1 IRE **± 7 mV**	± 1/2 IRE **± 3 mV**	88.2 IRE nominal **662 mV nominal**	44 IRE **533 mV**	148.9 IRE **985 mV**	78.0 IRE **582 mV**	98 IRE **936 mV**
Red phase	Nominal ± 90°	± 1°	± 1/2°	103.4° nominal	112.9°	112.9°	98.4°	108.4°
Reference ampl	**280 to 780 mV**	**± 7 mV**	**± 7 mV**	**420 mV nominal**	**599 mV**	**599 mV**	**400 mV**	**440 mV**
SC/H phase(1)	± 90°	± 5°	± 5°	0° nominal	-24°	24°	-10°	10°
Setup	± 15 IRE	± 1 IRE	± 1/2°	7.5 IRE, NTSC only	0.3 IRE	14.8 IRE	6 IRE	9 IRE
Sync ampl(1)	20 to 80 IRE **150 to 600 mV**	± 1 IRE **± 7 mV**	± 1/2° **± 3 mV**	40 IRE nominal **300 mV nominal**	32.2 IRE **201 mV**	47.7 IRE **399 mV**	35 IRE **265 mV**	45 IRE **335 mV**
VITC				Result:hh:mm:ss				
White bar ampl	50 to 138 IRE **350 to 980 mV**	± 1 IRE **± 7 mV** **± 7 mV**	± 1/2° **± 3 mV** **± 3 mV**	100 IRE nominal **700 mV (color)** **560 mV (freq)**	-49.5% **651 mV** **421 mV**	49.5% **749 mV** **699 mV**	70 IRE **680 mV** **505 mV**	110 IRE **720 mV** **615 mV**
Yellow ampl	Nominal ± 50% **Nominal ± 50%**	± 1 IRE **± 7 mV**	± 1/2° **± 3 mV**	62.2 IRE nominal **349 mV nominal**	42.5 IRE **727 mV**	81.5 IRE **720 mV**	52 IRE **398 mV**	72 IRE **678 mV**
Yellow phase	Nominal ± 90°	± 1°	± 1/2°	167.1° nominal	157.6°	176.6°	162.1°	172.1°
Zero reference pulse	50 to 138 IRE	± 1 IRE	± 1/2 IRE	On selected line				

(1) Available with Picture Guard

Range – The highest and lowest value that can be measured. **Bold** ranges and accuracies are for **PAL** automeasurement screens, when these are different from NTSC.

Absolute Accuracy – The relationship between the value measured and the actual value.

Relative Accuracy – The relationship between the measured value in one instance and the measured value in another instance, when the actual values are the same.

Min Setting – The lowest possible value of the minimum limit.

Max Setting – The highest possible value of the maximum limit.

Default Min/Max – Limit settings as shipped, or after a full system reset.

A. Specifications

Introduction

This appendix lists the SDM-560/560M Serial Digital/Composite Video Signal Monitor's electrical and mechanical specifications.

Electrical

Video Standards

- 525/625 Serial Digital 601 (SMPTE 259M, ITU-R BT.601-5)
- NTSC and PAL Composite

Inputs

NOTE: All SDM-560/560M input connectors are located at the rear panel unless otherwise noted.

Video Inputs

- Two SDI loop through inputs (input A and B)

Description	Specification
Format	270 Mb/s 4:2:2 525/625 component, complies with SMPTE 259M and ITU-R BT.601-5
Input type	Passive loop through
Input level	800 mV peak to peak +/– 10%
Input signal range	100 mV to 1000 mV
Maximum operating input voltage	+/– 2.5 V (dc + peak ac)
Return loss	≥ 15 dB, 1-270 MHz
Insertion loss	≤ 1.5 %
Jitter readout accuracy	+/– 0.05 Unit Interval (UI)

- One Composite and One S-video loop through inputs (input D)

Description	Specification
NTSC and PAL Standards:	
Return loss (75 Ω)	> 40 dB to 6 MHz
Maximum operating input voltage	+/– 2.5 V (dc + peak ac)
Input level before clipping	+/– 0.98 V relative to blanking level

Audio Inputs

- Two AES-3 (75 Ω single ended unbalanced input, 9 pin D-sub)
- Four analog balanced inputs (> 15 k Ω impedance, 9 pin D-sub)

External Reference Input

- Composite loop through (NTSC/PAL)

Outputs

NOTE: All SDM-560/560M output connectors are located at the rear panel unless otherwise noted.

Picture Monitor Display Outputs

- Serial Digital 601, Composite, and S-video

Decoded SDI Outputs (Analog Video)

- Component (Y, R-Y, B-Y, 525/625)

Auxiliary Outputs (AUX OUT)

- One Composite (NTSC or PAL)
- One S-video (NTSC or PAL)

Audio Outputs (9 pin D-sub)

- Two AES-3 digital audio outputs (balanced)
- Four channel analog audio outputs (unbalanced)
- Audio monitor output (two front panel ¼-inch headphone jacks for audio monitoring)

Display

- All displays are through SDI-capable or composite picture monitor
- Waveform, vector, picture, audio amplitudes, audio phases (SDM-560M only), and digital signal status in a split screen display
- Measurements, waveform, vector or picture on-screen display with audio meters
- Selectable SDI embedded audio metering: any one (4 channels) of 4 groups
- Serial digital parameters readout of signal strength, jitter, and EDH errors

- Gamut error detection with bright-up capability
- Picture Guard™ alarm on any “Out of Limit” condition (SDM-560M only)

Time Readout

- VITC or Real Time Clock (RTC)

Measurement Screens (SDM-560M Only)

- Digital Screen
- Component Screen
- Composite Screens
  - System Video
  - Color Setup
  - Frequency Response
  - Non-linear

Picture Guard™ (SDM-560M Only)

- Digital Signal Parameters
  - Signal strength (SSI, loss of signal)
  - EDH error
  - Timing Reference Signal (TRS)
  - Jitter
  - Peak video amplitude
  - Gamut error
  - Audio amplitudes (loss of audio)
- Composite Signal Parameters
  - Sync amplitude (loss of video)
  - Burst ampliture
  - Peak luminance amplituee
  - Peak video amplitude
  - Signal-to-noise ratio
  - SCH phase
  - Blanking (horizontal) width
  - Reference (horizontal timing and burst phase)
  - Audio amplitudes (loss os audio)

Transcoding

Description	Specification
SDI to Y, R-Y, B-Y (Y, P_R, P_B):	
Amplitude accuracy	+/– 1% with 1 V p-p video
Frequency response	Y: +/– 3% to 4.5 MHz – 3 dB to 5.5 MHz R-Y/B-Y: – 3 dB to 2.5 MHz
SDI to Composite and Y/C:	
Amplitude accuracy	Y: +/– 2% C: +/– 3%
Frequency response	Y: +/– 3% to 4.5 MHz (PAL/NTSC) – 3 dB to 5.5 MHz (PAL)

WFM

Description	Specification
Vertical gain accuracy	+/– 1% with 1.0 V input
Variable gain range	> - 35% to +15%
Vertical MAG	x 2.5 typical
Frequency response:	
Flat response	+/– 1% to 6 MHz +/– 1% to 6 MHz +/– 2% to 8 MHz (waveform mode) +/– 2% to 10 MHz (waveform/vector mode)
Low pass filter response	+/– 1% of dc at 50 kHz, < - 40 dB at fsc.
Band pass filter response	1.5 MHz bandwidth
Transient response:	
Pulse to bar ratio	0.99:1 to 1.01:1 typical
Pulse preshoot/ringing	< 1%
Line time tilt	< 1%
DC restorer:	
Slow	Typically 12 dB atten. At 50/60 Hz
Fast	> 26 dB atten. At 50/60 Hz
DC offsets between channels	+/– 7 mV
Timing difference between channels	+/– 5 ns
Sweep timing accuracy	Digitally derived

Vector

Description	Specification
Display accuracy:	
Amplitude error	+/– 2%
Phase error	+/– 1.25º
Chroma bandwidth	700 kHz +/– 100 kHz
Variable gain range	- 40 to +/– 20%
Variable phase	360º
Vector MAG	x 2.5 typical

Noise

Description	Specification
Unified weighting filter	<–70 dBm noise floor (SDM-560M only)

Audio

Description	Specification
Number of channels	4, one of 4 groups for SDI embedded audio
Impedance	> 15 k Ω balanced input
Dynamic range	60 dBm with 1 dBm resolution –8 dBm over reference limit
Maximum input level	+20 dBm
Frequency response	Flat within +/– 2 dBm from 100 Hz to 20 kHz
Connector type	9-pin D female (housing supplied)

Interfaces

- Computer interface: RS-232 control port (9-pin D-sub)
- Modem interface: RS-232 interface to modem for instrument control (9-pin D-sub)
- Memory interface: Logic level interface for instrument control through memories

Power Requirement

- Line voltage: 100 to 240 V ac, 50/60 Hz
- 100 V ac maximum

Mechanical

Dimensions

Description	Specification
Height	2 RU, 89 mm (3.5 in.)
Width	483 mm (19 in.)
Depth	432 mm (17 in.)
Weight	5.4 kg (12 lb)

Operating Conditions

- 0 to 50° C
- 90% relative humidity

Safety

- Tested to meet or exceed UL 1950, CUL 1402C, IEC 950
- CE Certified

B. Connector Pinouts

Introduction

This appendix identifies and describes the connector pinouts at the rear panelof the SDM-560M Serial Digital/Composite Video Signal Monitor (SDM-560M).

NOTE: Connector pinouts are viewed from the outside of the SDM-560M rear panel and/or viewed from the wire side of the furnished connectors.

Video Input/Output Connector (4-Contact mini DIN)

Pin Number	Description
1	Ground
2	Ground
3	Y (composite) in/out
4	C in/out

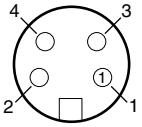

Figure B-1. Video Input/Out Pin Locations

RS-232 Connector (Modem/Printing) DCE

Pin Number	Description
1	Open
2	Transmitted data (TXD)
3	Received data (RXD)
4	Data terminal ready (DTR)
5	Signal ground
6	Data set ready (DSR)
7	Request to send (RTS)
8	Clear to send (CTS)
9	Open

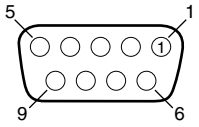

Figure B-2. RS-232 Pin Locations (Modem/Printing)

RS-232 Connector (Computer) DCE

Pin Number	Description
1	DCD
2	TXD
3	RXD
4	DIR
5	Ground
6	DSR
7	RTS
8	CTS
9	RI

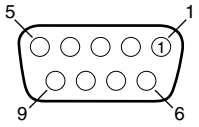

Figure B-3. RS-232 Pin Locations (Computer)

Analog Output Connector

Pin Number	Description
1	Alarm
2	No connection
3	Analog output 4 (unbalanced)
4	Ground
5	Analog output 1 (unbalanced)
6	No connection
7	Ground
8	Analog output 3 (unbalanced)
9	Analog output 2 (unbalanced)

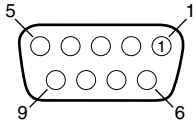

Figure B-4. Analog Output Pin Locations

Analog Input Connector

Pin Number	Description
1	Analog input 1+ (balanced)
2	Analog input 2+ (balanced)
3	Analog input 3+ (balanced)
4	Analog input 4+ (balanced)
5	Ground
6	Analog input 1- (balanced)
7	Analog input 2- (balanced)
8	Analog input 3- (balanced)
9	Analog input 4- (balanced)

Analog inputs 1 through 4 are two-wire inputs.

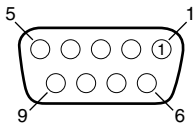

Figure B-5. Analog Input Pin Locations

AES3 I/O Connector

Pin Number	Description
1	Alarm
2	AES 2 input 75Ω
3	AES 1 output -
4	Ground
5	AES 2 output +
6	AES 1 input 75Ω
7	Ground
8	AES 1 output +
9	AES 2 output -

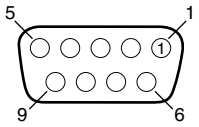

Figure B-6. AES3 I/O Pin Locations

DC Control/Alarm Connector

Pin Number	Description
1	Recall memory 1
2	Recall memory 2
3	Recall memory 3
4	Recall memory 4
5	Alarm out
6	Memory 1 out
7	Memory 2 out
8	Memory 3 out
9	Ground (earth)

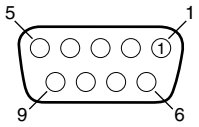

Figure B-7. DC Control/Alarm Pin Locations

C. SDM-560M Memory Locations

Introduction

This appendix lists the factory set memory locations for the SDM-560M Serial Digital/Composite Video Signal Monitor (SDM-560M). To make a change, follow the procedure described in “Saving Settings.”

Saving Settings

To recall any stored memory at any time, press one of the Memory Recall buttons (for memories 1 through 7) or the **Blue** (2nd) button and then one of the Memory Recall buttons (for memories 8 through 14).

After you configure the SDM-560M, you need to save it in memory. The following procedure explains how to store an SDM-560M configuration in a memory location selectable via the front panel Memory Recall buttons (see Figure 2-2).

> **NOTE:** You can also recall the first four memories through the ground closures of the DC control connector (see Figure 3-2).

When a configuration is saved in memory, all SDM-560M functions are stored in that memory. This includes items that are not displayed. For example, a waveform and measurement setup when a picture is displayed. For best results, recall a memory, make a modification, and then store the new settings in another memory location.

1. Configure the SDM-560M for a desired mode. This can normally be done by recalling a mode from another memory location.
2. Select the desired signal input by pressing the **Digital** or **Analog** button or through the *Config* menu options.
3. Using the Vertical and Horizontal Position knobs, center the display.
4. Press the **Config** button to access the *Configure* menu.
5. Using the arrow buttons, select *MEMORIES* and then press the **Enter** button.
6. Using the arrow buttons, select *Store Memory*.
7. Using the knob, select the desired memory number (1 through 14).
8. Press the **Down** arrow button to select *Store* and then press the **Enter** button.
9. Press the **Clr Mnu** button to exit.
10. If you intend to view signals of several different formats, save them in other available memories using steps 1 through 8.

    > **NOTE:** Settings for other formats or standards are also stored. For example, (1) the +V on/off setting for PAL even when memory is stored for NTSC and (2) limit settings for both standards are stored.

SDM-560M Memory Locations

Memory	Mode	Description	AUX Out	Other Items	Settings[2]
1	CPNT A	Split screen, component, audio phase, picture guard	Same[1]	Embedded audio	A input D input as CPST All limits set the same SC/H & color frame off Slow clamp Bowtie off Odd field line 21 Internal ref & internal, pict. ref. Time source RTC Grat marks off except on 7 and 14 Fast lock RGB off except 10 Jitter status off except where stated Jitter filter 10 kHz Indicators on Limit line off Grat on, mV Color bars 75% Embedded audio quick key
2	CPNT A	Picture, minimum status	Component parade waveform		
3	CPNT A	Picture, brightup on	Y and vector component		
4	CPNT A	Waveform parade, component	Same[1]		
5	CPNT A	Digital measurement screen	Same[1]		
6	CPNT A	Waveform, component Y and vector	Same[1]		
7	CPST A	Waveform, vector, composite 2H mag, grat marks, jitter on	Same[1]		
8	CPST A	Split screen, composite	Same[1]		
9	CPST A	Picture, minimum status	Composite parade of filters		
10	CPST A	Waveform/vector, composite	Same[1]	RGB bars	
11	CPST A	Waveform, composite parade of filters	Same[1]		
12	CPST D	D input picture, split screen	Same[1]	Limit line, analog audio and quick key	
13	CPST D	D input, waveform	Same[1]	Analog audio quick key	
14	CPST D	D input, waveform, 2H mag, grat marks	Same[1]	Analog audio quick key	

All inputs are set to A digital, D composite. Memory 10 has the D input displayed.

(1) The displayed waveform is the same as from the monitor output.

(2) These settings apply to all 14 memory locations except as noted.

Notes

D. Calibration

Introduction

This appendix explains how to access the *CALIBRATION* menu options (Figure D-1) for the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M).

CAUTION: Calibration should only be performed by qualified field service personnel.

To access the *CALIBRATION* menu options:

1. Turn the SDM-560M on.
2. When the Magni SDM-560M screen appears, press the **Blue** (2nd) button twice.
3. After the SDM-560M completely boots, press the **Blue** button twice to display the *CALIBRATION* menu options.

Figure D-1. Calibration Menu Options

E. SDM-560M Applications

Introduction

This appendix describes some of the applications that are available for the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M).

Digital Input (Dual Monitor)

Monitor 1 (picture monitor output):

- Picture with digital status
- Audio bars optional
- Waveform display
- Vector display

Monitor 2 (auxillary output):

- Waveform display
- Vector display

To set up the SDM-560M with dual monitors and a digital input:

1. Connect a digital picture monitor to the SDM-560M rear panel picture monitor output SDI BNC.
2. Connect a composite monitor to the SDM-560M rear panel aux out BNC.
3. Connect a serial digital signal to the SDM-560M rear panel serial digital in A BNC.
4. Press the **Digital A/B** button to select SDI-A. The SDI-A green LED lights when the SDI-A input has been selected.
5. Press the **Blue** (2nd) button and then press the **Status** button. Digital status indicators will be displayed on the digital picture monitor.
6. The audio bars can be enabled to display on the digital picture monitor by first pressing the **Blue** button and then pressing the **Clr Mnu/Audio** button.
7. Audio to be displayed by the audio bars is selected with menus accessed with the **Config** button.
8. Select a waveform or vector by pressing the appropriate button, **Waveform** or **Vector**.

9. If a waveform and vector are to be viewed at the same time, press the **Vector** button twice. After pressing the **Waveform** or **Vector** button, the waveform and/or vector will be displayed on the waveform monitor and the digital picture monitor.

10. After all front panel adjustments have been made to the waveform and/or vector, press the **Picture** button. Note that after pressing the **Picture** button, the digital picture monitor has the picture and no waveform or vector. Also note that after the **Picture** button is pressed, the front panel controls are disabled and will not change any of the waveform and/or vector settings as viewed on the waveform monitor.

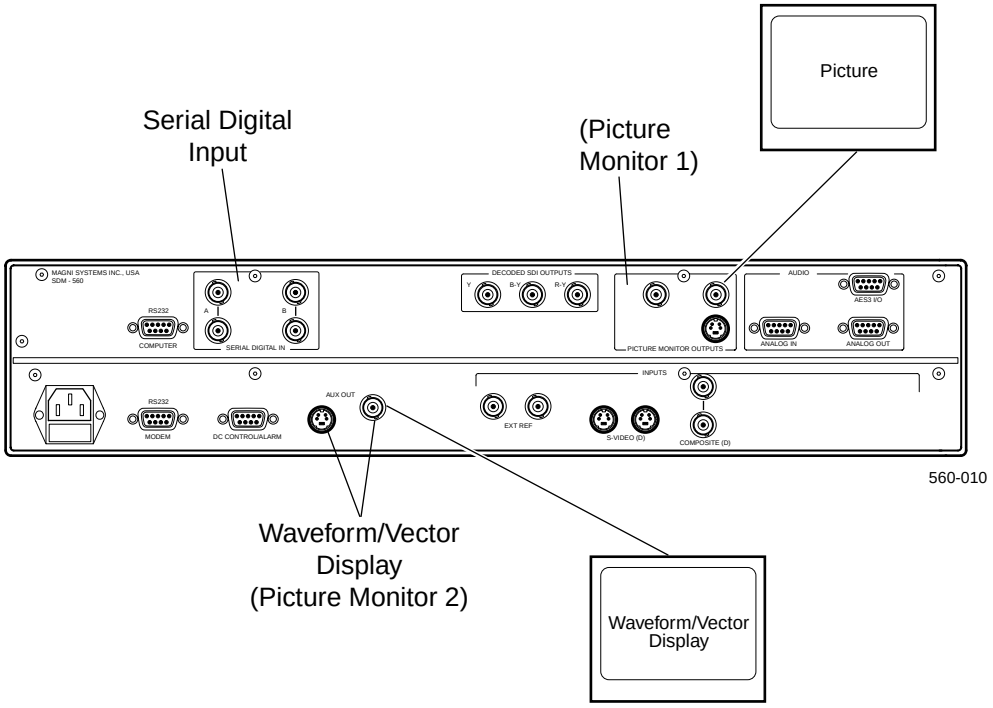

Figure E-1. Digital Input (Dual Monitor)

Gamut

- Gives an indication of problems that will be encountered when the signal is transcoded into any format. For example, component (Y, R-Y, B-Y), RGB, or composite.
- These limits are set using the *Msmt* (Measurement) menu options.
- Picture brightup indicates where the problem is on the picture display.
- A yellow LED lights when there is a problem.
- RGB bars also indicate picture levels.
- Line select lets you view problems more closely throughout the field.

Procedure

The following procedure provides an overview of how to detect problems that can be created in the process of transcoding a signal into another format, such as component (Y, B-Y, R-Y), RGB, or composite.

The SDM-560M can detect signal levels that exceed limits set unter its gamut limits. The gamut system and the gamut front panel yellow LED indicator are always enabled and will indicate detected out of limit conditions with respect to preset gamut limits.

For example, to detect gamut problems:

1. Connect a NTSC 75% color bar serial signal to the SDI-A input and a digital monitor to the picture monitor output of the SDM-560M.
2. Select signal input SDI-A by pressing the **Digital A/B** button.
3. Select CPST or CPNT by pressing the **Display** button.
4. Press the **Picture** button or the **Split Screen** button. Note that picture mode must be selected.
5. Turn on the RGB bars by pressing the **Blue** (2nd) button and then by pressing the up **Arrow**/**RGB** button (Quick Key). The RGB bars appear on the right side of the picture monitor.
6. Turn on gamut brightup by pressing the **Blue** button then by pressing the **Prev Mnu**/**Gamut** button (Quick Key). Note that the Gamut Brightup green LED lights and the letters “BRT” are displayed on the lower left side of the picture monitor, both indicating that Gamut Brightup mode is enabled.
7. Press the **Msmt** button to display the A/B Measurement menu.

8. Select DIGITAL CHA SET using the arrow buttons and then press the **Enter** button.
9. Select A GAMUT LIMITS and then press the **Enter** button.
10. Select Y with the arrow buttons and then select HIGH mV by pressing the **Enter** button (note the settings).
11. Using the adjustment knob, set the HIGH number down to 650 mV. Note that the first left color bar (white) is in brightup (flashing) mode on the picture monitor and the front panel yellow Gamut LED is lit both indicating an out of limit Y (luminance) value. The flashing portion of the picture indicates where the problem is in the picture.
12. Return Y to the initial value as noted before.
13. Repeat the above steps selecting (R-Y), p-p and adjusting the HIGH value down to 425 mV. Note that the out of limits for (R-Y), p-p is indicated by the flashing blue, green, violet and red color bars on the picture monitor and the lit front panel yellow Gamut LED indicator.

It should be noted that the saturation found under the DIGITAL CH A (or CH B) SET menu option, under the A/B MEASUREMENT menu, can be set to 75% or 100%. This setting changes the nominal reference value specified in the Serial A (or B) Gamut Limits menu only and does not change the gamut limits.

The number of consecutive picture pixels (duration of error) that have to be out of gamut limits before a limit error is indicated is set by the gamut filter number. The gamut filter can be set from 1 to 15. The smaller the number the narrower the filter. The larger the number the wider the filter. As the filter number is decreased, a problem can be resolved down to the exact number of pixels in error.

To locate a probem, indicated by the front panel yellow Gamut LED coming on and, if enabled, the the gamut brightup flashing a problem on the picture monitor, use interactively and alternately gamut brightup, various gamut limit settings, the RGB bars (which indicate picture levels), and the single line/field waveforms, with Line Sel (select), while viewing the picture and waveforms of the picture on the picture monitor.

Timing

- Provides signal offsets using an external reference.
- A input – settings to view a waveform or vector

The conventional way to look at the sync timing offset of an SDI or analog signal is to look at the waveform of the signal. This can be done using the SDM-560M. Another easy and more accurate way to look at sync offset is to view the vector phase displays of different signals. Although the phase has no relationship and is not contained in the digital signal, it is generated by the SDM-560M for viewing. By comparing the vector phase displays of the different signals, the timing differences can be measured or the timing of the signals can be matched by offsetting one of the signals. Note that on the display of the waveform, one minor division indicates 200 ns of offset in approximately 1/8 of an inch while the vector has 270 ns over 360 degrees (≈0.8 ns/degree). If the vector display on the picture monitor is approximately 4 ½ inches in diameter, the linear viewing length is its circumference of approximately 14 inches. A resolution gain of approximately 100x.

To compare the timing offset of different signals, connect a composite reference signal which can contain all video information or only sync information including burst (no chrominance or luminance information) to the SDM-560M rear panel external reference input.

To enable the external reference input, press the **Blue** button and then press the **Field Sel/Ext Ref** button. Note that the front panel green Ext Ref LED lights indicating that the signal reference is coming from the external reference input.

Apply signals to the appropriate inputs and then make the appropriate SDM-560M selections and settings.

Jitter

- 10 Hz – unit interval readout
  - Standard
  - Indicates how much timing variations are in an input signal
- Filter
  - The locking of instruments is critical to the output error-free video. The closer that the filtered jitter gets to one unit interval (one clock period), the more likely the video output will have problems.
  - Set filter to 10 kHz for most applications.
- Bar graph display
  - From filtered jitter; overturns red at 0.8 unit intervals

Serial digital signals can have timing variations. These variations can occur at low-to-high frequencies and can modulate the signal. Measuring this modulation while using specified high-pass filters provides a way to measure the jitter of an input signal. The measurements are displayed in unit intervals. A unit interval is defined as a digital signal's maximum period minus its minimum period divided by its nominal period values. The SDM-560M has four selectable high-pass filters. When a high pass filter is selected, frequencies below its cutoff are rejected. By taking the jitter measurement with alternate filters, the frequency and source of the problem can be determined. By pressing the **Blue** button and then by pressing the **Down Arrow**/**Status** button, the jitter bar graph display and numeric readout will be displayed in the upper-right corner of the picture monitor. On the display under HPF, the filter selected is displayed. Under the filter selected on the display, the unit interval value measured this reading. The more green in the bar graph, the lower the unit interval value. As the unit interval value approches 0.99, the less green in the bar graph until only the read level, indicating a unit interval of 0.80 or higher, is indicated. The actual value with the 10 Hz high-pass filter is always displayed under Timing Jitter (TIM) on the display and cannot be changed. The locking of instruments is critical to error free video output.

High frequency jitter can cause problems on digital phase lock loops which can cause color sub-carrier problems. Jitter can cause non-lock between equipment. A unit interval value of 0.75 or less is desirable. The smaller the number the better. Note that excessive jitter can be detected on the SDM-560M vector display, located at the rear panel. The SDM-560M has a high impedance jitter demodulated output accessible on pin six and pin seven (Gnd) of the analog output connector. The output can be monitored with a High Impedance (IM) input oscilloscope (for time domain menasurements) or High Impedance (HM) input spectrum analyzer (for frequency domain measurements). Measurements obtained from this output can help in locating the source of a jitter problem.

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F. Command Codes

Introduction

This appendix describes the RS-232 protocol between the SDM-560M Serial Digital/Video Signal Monitor (SDM-560M) and a Personal Computer (PC).

Guidelines

- Letters with ‘ ’ (single quotes) are literal and case sensitive. For example, an ‘a’ is the lower case ASCII letter a, with a decimal value of 97. In general, the case of the letters is significant and must be followed.
- <CR> means a carriage return. This is ASCII decimal code 13 or 0xD hex. It is used to terminate all text strings, either sending or receiving.
- Numbers inside [ ] represent an inclusive range. For example, [0…10] means any value from and including 0 up to and including 10.
- Spaces must not be used unless explicitly stated. A needed space is indicated by an underscore _.
- All data received or transmitted except raster dumps are ASCII values. For example, to send a value of 129, you must sent three characters: a ‘1’, a ‘2’, and then a ‘9’. This is not the same as sending a binary 129 value.
- Requests for information usually begin with a lower case letter. Control functions that change things usually begin with an upper case letter.

Placeholders

- S. .S is used to denote a string of characters. The string contains ASCII characters, possibly including spaces, but nothing below the ASCII binary value of a space (32), that is, no control codes.
- H is generally used to represent a hexadicimal digit from [0. . F].
- N is generally used to represent a decimal digit from [0. .9]. [N. .N] is used to represent an arbitrary number of successive digits that make up a decimal number.
- Bit 0 is always the Least Significant Bit (LSB).

PC to SDM-560M (Data Sent)

This section describes the data sent from a PC to the SDM-560M. Note that these strings are requests for data or control functions that affect the SDM-560M.

Request Functions

STATUS REQUEST	‘s’ <CR>	Refer to “Control Functions” for results.
BIT IMAGE SIZE	‘r’ N<CR>	Set raster image size N = 1 (full size image) N = 0 (¼ size image)

Example: r1<CR> causes the SDM-560M to select a ¼ size image.

SEND BIT IMAGE	‘q’ <CR>	Causes the SDM-560M to send a raster image. **Note:** The raster image is compressed according to the HP DeskJet method 2 TIFF compression (refer to the HP DeskJet Technical Reference Guide for details).
MEMORY STORE FUNCTION	‘M’ N<CR>	N is the memory number [1. .14] in which to store the current state.
MEMORY RECALL FUNCTION	‘m’ N<CR>	N is the memory number [1. .14] to be recalled.
V POS REQUEST	‘v’ <CR>	Also see V POS SET
H POS REQUEST	‘h’ <CR>	Also see H POS SET
VECTOR PHASE REQUEST	‘p’ <CR>	Also see VECTOR PHASE SET
VAR GAIN REQUEST	‘g’ <CR>	Also see VAR GAIN SET
SELECTED LINE REQUEST	‘l’ <CR>	Also see SELECTED LINE SET
MEASURE LINE REQUEST	‘n’ <CR>	Also see MEASURE LINE SET
SEND MEASURE DATA	‘b’ <CR>	ASCII string sent to PC
TIMECODE LINE REQUEST	‘t’ x<CR>	Also see TIMECODE LINE SET x = A for Analog 525 x = B for Analog 625 x = C for Digital 525 x = D for Digital 625
INTENSITY	‘i’ <CR>	Also see INTENSITY SET

REQUEST

PERSISTENCE REQUEST ‘d’ <CR> Also see PERSISTENCE SET

BUTTON REQUEST ‘B’N. .N <CR> N. .N = [0. .63]

This is the number of the button as follows:

Button Name	N. .N
BLUE	0
MES_MNT	1
CONFIG	2
UP_ARROW	3
PHASE	4
MENU_CLR	5
PRV_MNU	6
ENTER	7
DOWN_ARROW	8
VAR_GAIN	9
LINE_SEL	10
FIELD_SEL	11
SPLIT_SCRN	12
DISPLAY	13
ANA_INPUT	14
HMAG	15
SWEEP	16
VMAG	17
WFM_POS	18
DIG_INPUT	19
AUTO_MES	20
PICTURE	21
VECTOR	22
WFM	23
MEMORY 1	51
MEMORY 2	49
MEMORY 3	56
MEMORY 4	54
MEMORY 5	48
MEMORY 6	55
MEMORY 7	53

Example: B23<CR> is a click on the WFM button.

modemtmt string ‘_’ AT xxxxx Compatible Hayes AT modem command codes can be used

KNOB TURN	‘K’N. .N<CR>	N. .N = [0. .63] The bits of this number are as follows: BIT0 V0 – V0 & V1 are velocity bits BIT1 V1 – 00 = slowest; 11 = fastest BIT2 (not used, leave at 0) BIT3 N0 – N0 & N1 are the knob selector bits BIT4 N1 – 00 = VPOS; 01 = HPOS 10 = MENU/VGAIN/LINESEL PHASE 11 = (not used) BIT5 Set for clockwise rotation; clr for counter (anti) clockwise rotation

Example: K43<CR> is a fast clockwise rotation of the H Pos knob.

H POS SET	‘H’N. .N<CR>	N. .N = [0. .999] This is a normalized position, that is, a value of 500 would put the slider in the middle of the range. 0 is all the way to the left; 999 is all the way to the right.
V POS SET	‘V’N. .N<CR>	N. .N = [0. .999] This is a normalized position, that is, a value of 500 would put the slider in the middle of the range. 0 is all the way to the bottom; 999 is all the way to the top.
VAR GAIN SET	‘G’N. .N<CR>	N. .N = [-128. .255] -128 = most gain 255 = least gain Internally, the 255 value is compatible with the AVM-510 The –128 to 255 has more range than the front panel knob.
SELECTED LINE SET 1/3, 2/4	‘L’S. .S<CR>	Also see SELECTED LINE REQUEST The string has the form: “1/3:123” “1/3” an odd field “123” line 123

MEASURE LINE SET	‘N’S. .S<CR>	Also see MEASURE LINE REQUEST
	N1/3:XXX or N2/4:XXX	The string has the form: “1/3:123” “1/3” an odd field “123” line 123
TIMECODE LINE SET	‘T’XN. .N<CR>	Also see TIMECODE LINE REQUEST
		N. .N = [9. .25]
		If the X is missing, default to NTSC and PAL analog: A analog NTSC B analog PAL C digital NTSC D digital PAL
INTENSITY SET	‘I’N. .N<CR>	Also see INTENSITY REQUEST
		N. .N = [1. .127]
		1 is the minimum
PERSISTENCE SET	‘D’N. .N<CR>	Also see PERSISTENCE REQUEST
		N. .N = [128. .255]
		128 = minimum persistence 255 = infinite persistence
VECTOR PHASE SET	‘P’N. .N<CR>	N. .N = [0. .999]

SDM-560M to PC

This section describes the data sent from the SDM-560M to a PC. Note that this data might be requested by the PC or it might arrive at the PC unsolicited.

STATUS INFORMATION	'S'H0H1H2H3H4H5 H6H7H8H9H10<CR>	**Note:** A 'b' in front of a bit indicates the button status. An 'l' in front of a bit indicates that it is a Settings status. An 'm' in front of a bit indicates that it is a Menu item status.
	H0	b bit0 wfm mode active b bit1 vector mode active b bit2 picture mode active b bit3 automeasure mode active
	H1	b bit0 split screen active b bit1 HMag active b bit2 VMag active b bit3 line select active
	H2	b bit0 variable gain active b bit1 vector phase active l bit2 ext ref on l bit3 LED A on (A input)
	H3	l bit0 LED B on (B input) l bit1 single on l bit2 alternate on l bit3 parade on
	H4	l bit0 luma on l bit1 chroma on l bit2 parade (filter) on l bit3 LED 1H on
	H5	l bit0 LED 2H on l bit1 LED 2F on l bit2 LED 1 on (wfm pos) l bit3 LED 2 on
	H6	l bit0 LED 3 on l bit1 clamp fast l bit2 bowtie on l bit3 line select 15 line mode on
	H7	m bit0 +V switching on m bit1 100% color bars mode m bit2 wide (VCR) lock on m bit3 SC/H phase display on

	H8	m bit0 color frame display on m bit1 VITC time code on m bit2 graticule off m bit3 PAL graticule in percent
	H9	m bit0 LED D – S-Video input m bit1 LED D – CPST input m bit2 system in 625 line mode m bit3 Split screen
	H10	l bit0 C input l bit1 LED CPNT l bit2 LED CPST l bit3 LED Digital
H POS NOTIFY	‘H’N . .N<CR>	N. .N = [0. .999] Response to H POS REQUEST. This is a normalized position, that is, a value of 500 would put the slider in the middle of the range. 0 is all the way to the left; 999 is all the way to the right.
V POS NOTIFY	‘V’N . .N<CR>	N. .N = [0. .999] Response to V POS REQUEST. This is a normalized position, that is, a value of 500 would put the slider in the middle of the range. 0 is all the way to the bottom; 999 is all the way to the top.
VECTOR PHASE NOTIFY	‘P’N . .N<CR>	N. .N = [0. .999] Response to V POS REQUEST. This is a normalized position, that is, a value of 500 would put the slider in the middle of the range.
VAR GAIN NOTIFY	‘G’N. .N<CR>	N. .N = [-128. .383] Response to VAR GAIN REQUEST. -128 = least gain 383 = most gain
SELECTED LINE NOTIFY	‘L’S. .S<CR>	Response to SELECTED LINE REQUEST. Will return NONE for the selected line.
MEASURE LINE NOTIFY	‘N’S. .S<CR>	Response to MEASURE LINE REQUEST.

TIMECODE LINE NOTIFY	‘T’S. .S<CR>	Response to TIMECODE LINE REQUEST. Txx: TAxx Analog 525 TBxx Analog 625 TCxx Digital 525 TDxx Digital 625
INTENSITY NOTIFY	‘I’N. .N<CR>	Response to INTENSITY REQUEST. N. .N = [1. .127] 1 = minimum intensity
PERSISTENCE NOTIFY	‘D’N. .N<CR>	Response to PERSISTENCE REQUEST. N. .N = [128. .255] 128 = minimum persistence 255 = infinite persistence

PC to SDM-560M (Commands)

This section describes the commands sent from a PC to the SDM-560M.

REF SET	‘X’N<CR>	N = 0 for int N = 1 for ext
CLAMP SET	‘C’N<CR>	N = 0 for slow N = 1 for fast
BOWTIE SET	‘W’N<CR>	N = 0 for off N = 1 for on
LINE SELECT MODE SET	‘Q’H<CR>	H = 2 for 2 line H = F for 15 line
+V SWITCH SET	‘+’N<CR>	N = 0 for off N = 1 for on
100% COLOR BARS SET	‘O’N<CR>	N = 0 for 75% N = 1 for 100%

VCR LOCK SET	‘Y’N<CR>	N = 0 for crystal lock (narrow) N = 1 for VCR lock (wide)
SC/H PHASE DISPLAY SET	‘Z’N<CR>	N = 0 for off N = 1 for on
COLOR FRAME SET	‘F’N<CR>	N = 0 for off N = 1 for on
TIME DISPLAY	‘J’N<CR>	N = 0 for off N = 1 for on
GRATICULE SET	‘A’N<CR>	N = 0 for off N = 1 for on N = 2 for blanking marks off N = 3 for blanking marks on
PAL GRAT PERCENT SET	‘6’N<CR>	N = 0 for volts N = 1 for percent
MEASURE SET SELECT	‘S’N<CR>	N = 0 for SYSTEM VIDEO set N = 1 for COLOR SETUP set N = 2 for FREQUENCY RESPONSE set N = 3 for NONLINEAR set N = 4 for AUTOMEASURE set
IMAGE RECAL	‘R’N<CR>	N = 0 for image 1 N = 1 for image 2 N = 2 for image 3

PC CONTROL

REPORTING	'^R'<CR>	Sets RS232 and Modem interface to send reports from the REPORT function.
CONTROL/ LOGBOOK	'^C'<CR>	Sets RS232 and Modem interface to control the SDM-560M and transfer Waveforms.
MENU TOP	'U'<CR>	Puts cursor at top of current menu for entering comands remotely via the menu.

AUDIO

PASE METERS	'E'c<CR>	c = 2 turns meters ON c = 3 turns meters OFF
LEVEL METERS	'E'cf<CR>	c = 0 turns phase meters OFF c = 1 turns phase meters ON f = 0 for Embedded AES1 f = 1 for Embedded AES2 f = 2 for External AES1 f = 3 for External AES2 f = 4 for External analog input 1/2 f = 5 for External analog input 3/4
LEVEL SET	'E'cfxx<CR>	c = 4 for 525 Full Scale Digital (FSD) c =5 for 525 Standard Operating Level (SOL) c =6 for 625 Full Scale Digital (FSD) c =7 for 625 Standard Operating Level (SOL)
GROUPS	'E' cf<CR>	c = 8 for audio groups f = 0 for group 1 to 4 f = 1 for group 5 to 8 f = 2 for group 9 to 12 f = 3 for group 13 to 16
EDH	WIN[DOW] A(or B)	INF[FINITE], 1 SEC, 2 SEC, 5 SEC, 10 SEC, 1MIN, or 1 HR
	MOD[E] A(or B)	RUN[NING] or ACC[UMULATE]
	LAT[CH]	

INPUT	INP[UT]	A, B, D SV, or D CPS[T]
DISPLAY	DIS[PLY]	CPN[T], CPS[T], DIG[ITAL], CPS[T], or DIG[ITAL] CPN[T]
FILTER	FIL[TER]	NON[E], LUM[A], CHR[OMA], or PAR[ADE]

Notes

G. Glossary of Terms

1H

Display of one horizontal line of video.

2H

Display of two horizontal lines of video.

Alternate

A method of displaying separate signals or separate parts of a component signal in which the parts are super-imposed on top of each other.

Blanking

The level of picture when there is no picture information at all. The 0 VDC level. In NTSC, blanking is below the black level. In PAL, blanking and black are the same level.

BNC

The standard coaxial video connector.

Brightup

The brightening in a flashing mode of certain parts of a picture (while in picture mode) to indicate a problem where a gamut limit has been exceeded.

Burst

Color burst.

B-Y

The Blue minus luminance component of a component video signal.

Component Video

A video system in which the luminance and chrominance parts of the signal are carried on separate wires or in separate channels. Sony's Beta and Panasonic's MII are both component signals. The three parts of the signal are Y (luminance only), B-Y (blue value minus the luminance value) and R-Y (red value minus the luminance value). These parts are sometimes designated Y, Pb, Pr or Y, Cb, Cr. S-video is **not** considered a component system in this manual.

Chrominance

The part of the video signal with the color information. In component and s-video signals, the chrominance is carried in a separate channel. In composite, the chrominance is on a subcarrier in the same channel.

Clamping

Removing slow changes in DC level by all video levels to the blanking level.

Color Burst

The brief color subcarrier that immediately follows the trailing edge of sync.

Color Frame

A sequence of two (in NTSC) or four (in PAL) frames of video. Signals are “in the same color frame” if they both start with the same phase of burst.

Composite Video

A video signal carried in one channel or on one wire that has all the luminance and chrominance information. NTSC and PAL are composite video standards.

Configure

To choose options in the SDM-560M.

Even Field

Fields 2 and 4 in NTSC; fields 2, 4, 6, and 8 in PAL.

External Reference

A separate video signal, with or without picture information, used to lock or synchronize the signal being viewed. In the SDM-560M, the external reference sync signal must be at normal video sync levels. 4V sync, used in some video systems, is **not** acceptable and can damage the SDM-560M.

Field

The amount of video signal required to scan the picture once from top to bottom, including one vertical interval. In NTSC and PAL, two fields make one frame. Fields are designated as either odd or even.

Frame

The amount of video signal required to make one complete picture, or two fields. See also, Color frame.

Gamut

A signal component over levels detection system that indicates when a signal’s component amplitude levels exceed pre-defined amplitude levels.

GBR

Green, blue, red. These are the components of the video signal as they are first encountered in a camera. GBR is the same as RGB. In this manual, the letters are given in GBR order, because the green channel carries the sync pulse, if this signal has any sync at all.

Graticule

The reference marks in a waveform display showing horizontal lines for measuring amplitude. One line, the blanking line, has short vertical marks for measuring time. Also, the circular graticule for vector displays, sometimes called a “rose,” that is marked for degree measurements.

Internal Reference

Using the viewed signal's own sync as the SDM-560M's timing reference.

ITS

Insertion Test Signal. A test signal in the vertical interval. Same as VITS.

Jitter

Timing variations in a serial digital signal.

Luma

Luminance

Luminance

The parts of the signal that indicate the brightness of the picture.

MII

A component system designed by Panasonic.

Odd Field

Fields 1 and 3 in NTSC; fields 1, 3, 5, and 7 in PAL.

Parade

A sequence of separate line display spaced horizontally in the display. In the SDM-560M, a parade display is available for viewing the two inputs, for viewing the separate parts of a component signal, and for viewing the filters simultaneously.

Parameter

A quantity or characteristic of a signal that can be named and measured apart from other aspects of the signal, such as sync amplitude, chrominance/luminance delay, and peak video.

Picture Brightup

See Brightup.

Picture Guard

Engages some of the measurement capabilities of the automeasure screen when viewing a video picture.

RGB

Red, green, and blue components of a video signal. Same as GBR.

R-Y

The Red minus luminance component of a component video signal.

S-VHS

Same as s-video.

S-Video

A system of video in which there is one luminance (Y) channel and one chrominance (C) channel. Same as S-VHS.

Safe Action Area

The area within the picture where any action is sure to be seen on any television monitor or receiver. This is usually defined as all the central part of the picture except for anything closer than 5% to the edge of the scan.

Safe Title Area

The area within the picture where a title is sure to be seen on any television monitor or receiver. This is usually defined as all the central part of the picture except for anything closer than 10% to the edge of the scan.

SC/H Phase

The subcarrier (SC) to horizontal (H) phase, expressed in degrees. If the SC/H phase is larger than ± 40°, editing equipment might not be able to detect if two color signals are in the same color frame.

SMPTE

A standard set by the Society of Motion Picture and Television Engineers for a component video system.

VITC

Vertical Interval Time Code, a system for timing each frame of a video signal by inserting a digital signal in the vertical interval. It designates each frame with an hour, minute, second and frame count number, plus other numbers called User Defined. The SDM-560M can display the hours, minutes and seconds of the code.

VITS

Vertical Interval Test Signal, a test signal inserted onto a line in the vertical interval, sometimes in one field, sometimes in both fields.

Y

The luminance component of a component signal.

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